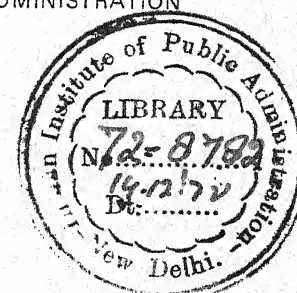


**READINGS
ON
PERFORMANCE BUDGETING**

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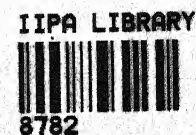
Edited By :
M. J. K. THAVARAJ
&
K. B. IYER

FINANCIAL MANAGEMENT UNIT
INDIAN INSTITUTE OF PUBLIC ADMINISTRATION
NEW DELHI



Introduction By
G. MUKHARJI
DIRECTOR, INDIAN INSTITUTE OF PUBLIC ADMINISTRATION
NEW DELHI

RESEARCH : DELHI



INTRODUCTION

Concern for results where public funds are involved has for long been in terms of investments made or expenditure incurred. It is a welcome development of recent years that the concern has acquired another dimension in terms of effective physical achievement for the amounts spent. It is but logical that the quest for effectiveness should encompass the areas of policy decisions, and the most economical way of implementing them. This approach which is basic in commercial transactions of private limited companies, when applied to public operations of government is known as Programme or Performance Budgeting.

Given the task, how best to achieve it in terms of cost and time, is a managerial problem. Performance Budgeting provides such an approach to management. The immortal Vicar of Wakefield chose his wife as she chose her wedding gown, for qualities that wear well. Likewise it is the well-wearing qualities that commend Performance Budgeting in business as well as in government.

What are the qualities that characterise this approach? In answer I must refer the reader to the succeeding pages.

The present Readings as well as its companion Readings on Budgeting and Financial Control and Performance Budgeting for Public Sector Undertakings (being published) comprise edited papers which are being used as background material supplied to the participants of the various training courses organised by the Financial Management Unit by the Indian Institute of Public Administration. The need for compiling and publishing them in a handy volume for ready reference has long been felt both by the participants of these training courses as well as their organisers.

Readings on Performance Budgeting have been arranged in the following parts for facility of perusal.

Part A : Essentials of Performance Budgeting

Part B : Experiences in Performance Budgeting

Part C : Appendices

In PART A, two papers explaining the principles of Performance Budgeting have been included besides a paper on classification and accounting structure in Government for Performance Budgeting. A paper on Workload and Work Measurement for Performance Budgeting explains the basic need for applying an evolving and updated unit cost concept,

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Network or CPM is a specific tool in operational situations where scheduling not merely to pre-determined time but ear-marked cost estimates is of the essence. In areas of capital expenditure of a non-repetitive character, the technique of Network/CPM can be combined effectively and advantageously to the approach of Performance Budgeting. A paper on Network/CPM has therefore been compiled together with a paper on Performance Budgeting for Capital Projects.

In PART B are given papers on the experiences of USA in applying Performance Budgeting as well as the necessity for adapting the approach in the Indian context. In its Occasional Papers published separately, the IIPA has drawn upon public lectures by learned speakers. These could be perused for additional information on foreign experiences.

In PART C (Appendices) is given among others, a paper on Performance Auditing besides typical workshop exercises attempted by the participants of the training courses in IIPA to exemplify operational and capital budget situations.

A Glossary of important terms and a select bibliography are provided in this Part.

For a hurried perusal, Papers 1,2 and 6 in Part A and Papers 1 and 4 in Part C are recommended.

In editing papers of the nature included in the Readings, an amount of overlapping and occasional contradictions is inevitable. In extenuation it is pleaded that it is more satisfactory to light a candle than curse the darkness.

Our thanks are due to the various contributors. I must acknowledge the heavy load of editorial work cheerfully undertaken by my colleagues Dr. M.J.K. Thavaraj and Shri K.B. Iyer.

G. MUKHARJI

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CONTRIBUTORS

Dr. M.J.K. THAVARAJ

Professor and Head of the Financial Management Unit, Indian Institute of Public Administration, New Delhi. Has travelled widely and been teaching for many years. Has contributed many papers and articles to learned societies and seminars.

SHRI S.S. VISWANATHAN

An Officer of the I.A. & A.S; was associated with the studies of the C.O.P.P. of the Planning Commission, New Delhi. Presently on deputation with the Indian Institute of Public Administration, New Delhi.

SHRI C.S. PARTHASARATHY

Director (Management), Planning Commission, Civil Engineer, Full Member of the Institution of Engineers (India), has had many years of experience in actual applications of PERT/CPM techniques in the construction, planning and control of various projects. Has many technical papers to his credit.

SHRI E.R.K. MENON

Officer of the Central Secretariat Service, as Deputy Secretary to the Government of India in the Ministry of Finance (Economic Affairs), was concerned with the introduction of Performance Budgeting in Government.

SHRI T.P. KHOSLA

Member of the I.A. & A.S., Deputy Secretary to the Government of India, Ministry of Defence.

SHRI K.B. IYER

Officer of the Central Secretariat Service, presently Under Secretary to the Government of India in the Cabinet Secretariat, Department of Electronics—Has been associated with the training programmes, special courses, seminars etc. organised in the area of financial management, by the Indian Institute of Public Administration, New Delhi.

PART A

ESSENTIALS OF PERFORMANCE BUDGETING

1

PRINCIPLES OF PERFORMANCE BUDGETING

M. J. K. Thavaraj

PERFORMANCE Budgeting is generally understood as a system of presentation of public expenditure in terms of functions, programmes, performance units, viz., activities/projects, etc., reflecting, primarily, the governmental output and its cost. In accordance with such a functional classification the term 'programmes' related to a higher level of organization embracing a number of performance units; though at times, in the budgetary parlance, the terms 'programmes' and 'performance budgeting' have been used more or less interchangeably. In recent literature, however, programme budgeting is meant to denote a system of classification in terms of functions, missions, programmes and programme elements with a view to integrating planning and programming with budgeting.

The Programme Budgeting System tends to highlight the need for clearly defined objectives; choice between alternative programmes based on their cost-benefit implications; spelling out of the future cost repercussions of near-term financial commitments, etc. In essence, Programme Budgeting, emphasizes the need for over-all programme management in the light of long-term objectives. The keynote of Performance Budgeting, on the other hand, has been on improvement of internal management on the basis of the volume of work to be accomplished (during a financial year) and its cost. Consequently, Performance Budgeting involves the development of more refined

management tools, such as work measurement, performance standards, unit costs, etc.

In a planned economy, it is logical to think in terms of budgeting both as the nearest link in a well-integrated system of planning, programming and budgeting and as a tool of management, providing a system of information for decision making, co-ordination, evaluation and control to appropriate levels of the organization.

Besides favouring a "rolling" plan (as against 'terminal' five or six-year plan) an integrated programme budget would demand a clearer expression of national and programmatic goals, formulation of alternative programmes with the delineation of their cost and output streams, choice of programmes as well as the determination of an order of priorities on the basis of their relative costs and benefits. These are indicative of the high degree of sophistication in the techniques and practices of planning and programming that needs to be attained in order to ensure a rational utilization of the national resources. Performance Budgeting could be the basis of such a superstructure.

The managerial potentialities of budgeting may be developed through : (a) the classification of public expenditure in terms of functions, sub-functions, programmes, sub-programmes—projects/activities, works/tasks ; (b) the establishment, improvement and extension of activity schedules for all measurable activities of government ; (c) the establishment of work output, employee utilization standard or unit costs by objective methods; and (d) the creation of related cost and performance recording and reporting system.

Whereas the classification of operating expenditure is in terms of functions, programmes, activities and tasks, that of investment expenditure is in terms of functions, programmes, projects and works. The U.N. Manual for programme and performance budgeting has defined these terms clearly.

Functions represent broad groupings of operations that are directed towards accomplishing a major purpose of government.

Programmes refer to broad categories within a function that identify the products of major organizations. In the operating categories, it constitutes an instrument for performing functions by which goals could be set and realized by high-level administrative units. As an investment category, a programme constitutes an

integrated set of investment projects. Complex programmes are divided into sub-programmes to facilitate execution in specific areas.

An activity refers to a more limited division of action geared towards the attainment of the goals of an operating programme or sub-programme involving processes for which an intermediate or a lower-level administrative unit is responsible. An activity consists of several specific operations forming part of process aimed at achieving a particular result. On the other hand, a project refers to a series of works in an investment programme or sub-programme for the formation of capital goods, which are carried out by a production unit capable of functioning independently. Works constitute a part of a stage in the formation of capital goods that is a segment of a project. Thus, functional classification is the sheet anchor of performance budgets which aggregate budget data to show the share of public expenditure devoted to each public service.

Activity schedules are designed to highlight the major purposes to be served, the identification of programmes directed towards these ends, indication of projects/activities under each programme as well as the measurement of the volume of work with data on past, current and anticipated workload, such as the number of children to be educated, number of hospital beds to be provided, number of trees to be planted, tons of garbage to be collected, etc. These measures should, as far as possible, be countable, reflective of the important resources used and should be set forth in functional terms. If the organizational structure corresponds to the functional framework of an agency or department, it will facilitate the decentralization of programme and financial responsibility to suitable operational levels within the organization.

Performance Budgeting cannot make much headway without proper measures of work. But there is no single yardstick for measuring activity or for determining performance standards. Some agencies can use workload and unit cost data; others may use mere workload data or some descriptive material. Often, 'unit cost' conjures up visions of tremendous accounting charts, elaborate distribution tables and scores of accounting personnel busily preoccupied with problems of allocating administrative and other overheads on a cost accounting basis. Though it may be desirable to move progressively in the direction of more accurately quantified work and cost data, less sophisticated measures suitable to lower stages of development

and skilled manpower of the various agencies may be employed in the short run. Standards set should be based on a complete understanding of the nature of the work rather than on historical or comparative data. Imperfections on this score would call for flexible standards which may be improved upon over time.

Record-keeping along functional lines would help to bring out the variance between budgeted and actual costs, thereby enabling management to check on the work accomplished against work assigned. Some operational factors are likely to lie behind every variation. Wide variations in performance ratios may be indicative of improper personnel utilization, improper work distribution, inadequate procedures, inadequate equipment, operation, etc. Some of these may be remediable. Where the variation is due to remediable factors timely and suitable actions may be taken to eliminate the gap. An ideal reporting system should cover the volume, quality, time expended and costs of each programme or activity. Accrual accounting may be used wherever appropriate.

It should be recognized that in some areas like diplomacy, work may not be measurable; certain others, like police or fire protection, may not lend themselves to refine measurements; some with large administrative overheads may present knotty problems of cost allocation; sometimes running accounts of work may not tie neatly with budgetary allotments. Nevertheless, a predominant segment of government operations can be reduced to sensible quantitative categories capable of measurement at varying degrees of refinement. Experience has shown that the advantages of pressing forward in the direction of quantifications and measurements are enormous. Much, however, depends on whether the introduction of Performance Budgeting is a part of a major change in budgetary and administrative philosophy. Given the desire and drive for efficient management of governmental organizations, Performance Budgeting could serve as a convenient tool of management. It helps administrators to prepare their budgets on the basis of what they hope to accomplish; it serves both as a tool for reviewing the efficiency of existing operations and their results and as a system of feeding the data for planning future services; it upgades the budget decision-making process by throwing up the requisite information on cost and work accomplishments appropriate for various levels of operation; it makes legislative review, control and policy-making more meaningful and makes budgets informative and understandable to the taxpayer. It should be an

excellent instrument for translating long-term plans and programmes into reality. It is certainly not a panacea for administrative ills. But, in the hands of skilful administrators, it should produce impressive results.

Within this broad framework of Performance Budgeting, the technique of 'cost-effectiveness' may gradually be introduced in quantifiable areas. This would facilitate a rational choice of programmes in terms of the relative cost and benefit streams of comparable alternatives designed to fulfil the same objectives. Such an improvement would help to integrate the processes of Planning, Programming and Budgeting.

India has a growing public sector with a large developmental component. It has practised *ex ante* quantification of her long-term objectives. It has had some experience in programming. But, budgets are not phrased in the same language of the plans. Despite the various reforms, the classification of the budget still remains 'eclectic.' There is hardly any attempt at measurement or costing. There is an enormous crisscrossing of functional and organizational responsibilities. The 'Demands' structure and account heads are somewhat archaic. Accounting is not yet an internal responsibility. Timely and adequate information is not made available for review and corrective action. In essence, budget has not yet become a handy instrument for management. It has to go a long way towards the development of an integrated system of Planning, Programming and Budgeting. The introduction of Performance Budgeting is likely to be a step forward in overcoming some of these deficiencies.

There are certain steps that may be necessary for the installation of Performance Budgeting in India. Firstly, it may be necessary (i) to change the accounting format, 'Demand' structure, and the role of the Office of the Comptroller and Auditor General of India, and (ii) To restructure governmental organization more or less on functional lines. Secondly, arrangements will have to be made to persuade all the state governments to accept the timetable for the transition to Performance Budgeting. Thirdly, a five-year plan for the adoption of the Performance Budgeting in all the departments of the central and state governments may be drafted. The new system may be introduced in selected departments in the Centre and in each of the State Government. A progressive switch-over may be phased so that the budgets in all the departments of the central and state governments may be converted to a performance basis over a five-year period. Beginnings

may also be made in the progressive metropolitan governments in developing performance budgets. A similar time-table may also be set for introducing accrual accounting in areas, such as public work, railways, irrigation, defence, P & T, etc., where it is likely to be most effective. Initial efforts in this direction may be spent on identifying areas where accrual accounting is more essential. A switch-over to this system should be preceded by adequate preparation, especially with a view to reorienting the accounting facilities in the new concepts, procedures and purposes. Fourthly, the Indian Institute of Public Administration with the help and support of the Department of Administrative Reforms, Planning Commission, the Ministry of Finance, the Auditor and Comptroller General's office and corresponding agencies in the state governments, may spearhead the movement towards Performance Budgeting.

Finally, it is but natural that every human being resists changes and particularly those which upset the fundamental aspects of his daily work. Adequate preparation to improve human acceptance is, therefore, necessary to smooth the transformation process. Apart from neat and comprehensive manuals of instruction, group meetings, discussions, conferences, seminars, short courses, etc., may have to be organized covering a fair percentage of the personnel involved in the affected agencies. The I.I.P.A. may play the co-ordinating role in this important area.

2

PERFORMANCE BUDGETING

M. J. K. Thavara

BUDGETING involves preparation of the estimates ; collection and custody of funds ; disbursement and control of expenditure and recording of all the transactions whose legality and regularity are duly verified by an independent audit. Some prominent features of the British constitutional development, such as the evolution of constitutional monarchy accompanied by the growth of the cabinet system of government have left their imprint on the British financial system. Hence, the predominance of the Treasury over the entire financial machinery, a feature which remains substantially unchanged despite the creation of a number of legislative committees designed to make the executive accountable to the legislature. Highly centralized versions of the British system with their strings of control located in the Whitehall were extended to the governments in other parts of the British Empire. The extreme centralization which characterized the Indian system until recently could be traced to its colonial past.

The process of evolution has been the other way round in the United States of America where no central budget agency emerged out of the disorderly congressional system until the passage of the Budget and Accounting Act in 1921 which led to the establishment of the Bureau of the Budget as part of the Presidential staff within the Treasury Department and the General Accounting Office under the independent jurisdiction of the Comptroller General of the U.S.A.

Most of the Latin American governments which have imitated the Presidential system of the United States of America have established bureaux of budgets as part of the executive arm endowed with enormous powers. The Philippines has also adopted the American system.

Despite the difference in the relationship between the legislature and the executive, the accent of all the traditional systems of budgeting is on accountability based on suspicion on the part of the higher executive organs of the government about their subordinate agencies and the legislature about the executive. Such an accountability was sought to be established in terms of a detailed scrutiny of the objects to be purchased (such as materials, supplies and equipment) and salaries to be paid. Of course, the government, and more often, the various Commissions that reviewed the financial systems, from time to time, were very much concerned with the promotion of efficiency and economy. But, such a concern was demonstrated almost entirely through a rationalization of the traditional framework of financial control which was based on itemized scrutiny rather than on relating the work done with the cost involved.

Such a system was devoid of a reliable yardstick to measure efficiency or economy. This deficiency, however, was not a serious handicap so long as the State did not extend its activities very much beyond the police or security functions. The primary concern of the State, therefore, was law and order and protection of individual rights to property, contracts, etc. The colonial governments were also pre-occupied with the maintenance of law and order, orderly assessments and collection of taxes, maintenance of land records, averting or dealing with crises and calamities, etc. Maintenance of the status-quo was their immediate concern. There was neither the direction nor the drive towards socio-economic change.

✓ In the underdeveloped economies of today, the State has become the pioneer, protector, activator and regulator besides being the creator of an institutional, social environment conducive to rapid economic and social change. In this context, the scope of the public sector embraces social overhead capital as well as directly productive undertakings. The sole emphasis here is on directional change at a stable or accelerate rate. Sometimes, the rate and pattern of change is spelt out in detail. The detailed targets are *ex ante* quantified. The processes of achieving these are clearly delineated. Under this

dispensation, the Government has become a change-agent, a problem-solver and an innovator. In this developmental context, administration needs a guiding philosophy having a mass appeal. Of course, there should be an imaginative leadership which is action-oriented ; which creates the institutional and organizational framework conducive to development and which could shape the attitudinal and behavioural complexes of the masses of the people and involve them in the process of development. ✓ At the same time, it calls for planners, programmers, organizers, operators and administrators, who are firmly committed to change, who have penetrating understanding of the environment, who are familiar with the processes of change, who possess the requisite knowledge of field work, who could adapt and innovate. Here administration should pinpoint areas of change, translate the programmatic values into operational terms, shape the behavioural patterns in line with the functional contents of development, redraw the hierarchical arrangements, create and augment the requisite field operators and evolve suitable channels of communication and mechanism of control. Thus the whole emphasis of administration shifts to commitment to programmatic values and management of programmes.

The functions of management are to concretize the societal values in terms of suitable policy vehicles, employ the most economical and efficient methods and techniques of administration, evaluate the performance of the programmes in the light of their overall goals and to bring about suitable adjustment in the policies and programmes intended for the future. ✓ Budgeting is a management function. When planning, programming, co-ordination, control, execution, evaluation etc., are combined in a budgetary system, it becomes an effective tool of management. For an effective discharge of these functions, budgeting has to become the principal instrument of resource mobilization, its optimal allocation and economic utilization, prompt and systematic communication, rigorous appraisal and accountability. Performance Budgeting* is designed to carry out the managerial functions. Performance Budgeting made famous by the Hoover Commission is essentially a process whereby the projects/activities of the performing units are converted into centres of organizational work

* According to Jesse Burkhead, programme relates to a higher level of organization than performance units—i.e., a programme embraces a number of performance units (projects or activities).

and financial responsibilities. It focuses attention on the ends to be served by the government rather than on the amount of money to be spent—What ? (Define precisely the work) How much ? At what cost ? Further, the proposed work, its purpose and related costs are developed as part of the long-term goals and programmes, such as those contained in the development plans.

The performance budget document is prepared on the basis of functions and objectives of the several agencies and departments of government rather than exclusively on the basis of objects of expenditure and organizational units. A function, for this purpose, has been defined as a major division of the total organized effort of government, the purpose of which is to provide a distinct public service. A programme represents a segment of a function and an activity/project represents the division of a programme into homogeneous types of work. Functional classification can be illustrated as follows :

Function	Agriculture
Programme	Agricultural production
Project	Establishment of seed farm
Activity	Seed multiplication

The distinction between the object and functional classification can be seen from the following presentation relating to the Central Mechanized Farm, Suratgarh.*

Current Classification (Revenue Demand No. 43—Agriculture) (Major Head 31) :—

B. Experimental Farms :

B-1 Central Mechanized Farm (Non-Plan)

B-1 (1) Pay of Officers

B-1 (2) Pay of Establishment

B-1 (3) Allowances & Honoraria

B-1 (4) Other Charges

B-1 (5) Purchase of Machinery and Equipment.

Performance Budgeting

I. Programme of activity

(1) Agricultural Operations

(2) Animal Husbandry

(3) Horticultural Operations

(4) General Administration

Total

II. Object Classification

(1) Salary and Allowances

(2) Labour

(3) Manure

(4) Stores and Spare parts

B-1 (6) Repairs to Buildings and Roads.

Total Non-Plan

Plan—Suratgarh Farm :

B-1 (1) Pay of Officers

B-1 (2) Pay of Establishment

B-1 (3) Allowances, Honoraria etc.

B-1 (4) Other Charges

B-1 (5) Purchase of Machinery and Equipment

Total

Plan

(5) Seeds

(6) Petrol, Oil & Lubricants

(7) Land Revenue and Irrigation arrangements

(8) Machinery and Equipment

(9) Repairs to Buildings

(10) Other Charges

Total

III. Financing Major Head (31)

Total

The totals of I, II and III would be same. Similar distinction can also be made between functional and organisational classifications.

Principal Components of Performance Budgeting

Catharyn Seckler-Hudson has delineated several elements of performance budgeting which may be summarized below. According to her, executive budget programming requires that individual agency programmes should be formulated and considered in terms of the government programme as a whole and should be in accordance with the policies established by the executive. A sound work programme for a specified time period, should include for each activity a clear definition of objectives, the choice of basic methods for achieving the objectives, a forecasting of how much and what kind of work is to be done, when and at what cost. Consequently, the first step towards Performance Budgeting is the establishment, improvement and extension of activity schedules stating the major purposes to be served, the identification of programmes geared towards ends, indication of project activities under each programme and the measurement of the volume of work with data on past, current and anticipated workload such as the number of children to be educated, number of hospital beds to be provided for, number of trees to be planted, number of square kilometre of area to be swept, etc. These measures should be countable and clear reflection of the important resources used and should be set forth in functional terms. If the organizational structure

* Introduction of Performance Budgeting in Central Mechanized Farm, January 1966, Planning Commission.

corresponds to the functional framework of an agency or department, it will facilitate the decentralization of budgeting programme and financial responsibility at every level within the organization.

The second step towards Performance Budgeting is the installation of work measurement and the application of performance standards within the administrative agency without which Performance Budgeting could be defeated. It is, however, recognized that there is no single yardstick for measuring activity or for determining performance standards. Some agencies can use workload and unit cost data; others can use workload data; still others can use only explanatory or descriptive material. Agencies at different stages of development should be encouraged to devise and use the most suitable methods for a given programme and move progressively towards higher levels of perfection. Determination of suitable standards should be based on a complete understanding of the nature of the work and past records of similar work. Any standard so derived should be tentative allowing for deviations. After having allowed for such deviations, the variances between actual and standard performance would suggest some corrective action, thereby enhancing the value of budget control.

The third important step along the road to Performance Budgeting is the establishment of record keeping along functional lines. Such reports would indicate the variance between budgeted and actual costs thereby enabling management to check on the work accomplished. Obviously, behind every such variation there must be reasons in operating conditions. Some of these are remediable and others non-remediable. Where the variation is due to remediable factors, timely and suitable actions could be taken to eliminate the gap. An ideal reporting system should cover the volume, quality, time expended and costs of each programme or activity. But even the weakest should contain at least the data regarding the volume of workload for each activity.

An efficient system of information and reporting presupposes an adequate and proper accounting support. Basically there must be an integration of budgeting and accounting classifications. Accrual accounting should be used wherever appropriate. But in view of the difficulties involved in determining costs and expenses in relation to changes in assets and liabilities the switch-over to accrual accounting should be properly phased over a fairly long period. Similarly, trading services and enterprises should be equipped with business

type accounts and costing systems wherever feasible. Ideally, commercial accounting will be reliable and complete only when they are on a double entry basis and a balance sheet prepared at the end of the year. Hence every step towards the adoption of double entry system and accrual accounting may be regarded as a gain in precision and completeness. It should also be recognized that accounting is an administrative function which should be decentralized within the agencies to the degree practicable in terms of delegated operating responsibilities and the desired degree of centralized control. In short, Performance Budgeting calls for a vastly improved accounting system which will enable all responsible persons to appraise the value of programmed activities in the light of programme costs and accomplishments.

There must be an improved organization and programme management to take full advantage of the data made available through performance reporting. It should be the constant endeavour of the higher organs of the executive so to evolve new methods, procedures, techniques of operation and systems of internal audit, etc., as to use the available data for meaningful reviews and analysis of the activities with a view to improving their effectiveness and economy in operations.

An important element in Performance Budgeting is that various types of expenditure which are essentially different in character, such as capital outlays and current operating costs should be presented, justified and authorized separately under each major programme in the budget. A capital cost is an expenditure for the acquisition, construction or improvement of property of equipment (fixed assets), such as land, buildings, plant or machinery. An operating cost is an expenditure other than a capital cost incurred in carrying out a specific programme or activity. These two types of costs are different in character and in programme budget should appear separately under each major activity. In the words of the Hoover Commission :

“While capital project may be carefully analyzed for usefulness, timeliness and total probable costs at the time of original authorization, the total remaining costs of all capital projects should be set forth in the budget each year, together with costs incurred to date. These costs should be revised in succeeding years to keep them current with later developments.”

It is true, that 'above the line' and 'below the line' distinction is made in the traditional accounting practice prevalent in several countries. But, this is done mainly with a view to distinguishing between the revenue-financed and loan-financed segments of expenditure rather than to rationalize the budget in terms of strictly economic categories.

In logical terms, uniformity in classification at all stages of the budgetary process should be extended to the appropriation structure as well. The structure of appropriation which provides the life blood for those activities should be in accordance with the underlying purpose of long-range planning and programme control.

Ideally, in the establishment of a Performance Budget System all these elements of improvement should move forward simultaneously. This is especially desirable since all these elements stand together. In practice, however, no one aspect of Performance Budgeting should remain static merely because some other point is imperfect. For improvement in one area stimulates and encourages other improvements and the inter-action of all will finally determine the level of accomplishment.

3

PERFORMANCE BUDGETING IN INDIA: CLASSIFICATION AND ACCOUNTING ASPECTS

S. S. Viswanathan

THE establishment of a meaningful classification structure is of primary importance in developing a sound financial management system in government or any organization, as it provides the basic framework for all decision making and analysis. The budgetary and accounting structure as well as the contents of the budget are the determining factors not only on the adequacy and effectiveness of legislative control over financial administration and the decision making processes, but also an effective expenditure control and management within the executive, correlation with the long-term and annual development plans, implementation and evaluation of the various programmes and activities at different levels and a proper economic analysis of the government transactions. In the context of the increased size and complexity of the activities of modern governments accounting and budgetary structure is significant, apart from the accountability functions, for its ability in translating into action the governmental programmes and in implementing the social and economic objectives of government policy.

A government needs the type of accounts which are adequate in relation to the purposes to be served. Broadly speaking, the purposes

which must be served by Government accounts are as follows:¹

- (a) Accounting system must facilitate financial and legal accountability, both from the executive to the legislature and within the executive, from lower to higher levels;
- (b) It should serve as a tool of the executive in ensuring financial control;
- (c) Accounts must be maintained on a basis which will facilitate an independent audit;
- (d) The system of accounts must provide management at all levels with timely information for planning, programming and directing the several programmes and activities;
- (e) The accounting system should throw up information which could be related to the broad functional areas served by the government in order to enable a rational determination of the allocation of resources among the several functions; and
- (f) Government accounts must facilitate economic analysis and planning of governmental operations.

The various purposes mentioned above could be brought under two broad areas—accountability and management functions. Traditionally, the form of accounts in India prescribed by the Comptroller and Auditor General with the approval of the President, is the basis on which budgets are prepared and presented to the legislatures by the Central and State Governments. The classification and accounting structure has been evolved and developed mainly to ensure financial and legal accountability of the executive to the legislature and observance of similar accountability on the part of each subordinate authority within the executive itself. Accountability and financial control are the twin considerations that have weighed in the determination of the format of the structure. With this end in view, the form of accounts has a close correspondence with the departments or agencies collecting receipts or incurring expenditure. The basic principle² of classification of Government transactions in India is that the classification shall have closer reference to the department(s) in which the revenue or expenditure occurs than to the purpose of the revenue or expendi-

¹ See also "Government Accounting and Budget Execution", United Nations, Deptt. of Economic Affairs, New York, 1952.

² Article 30 of Account Code Vol. 1, Comptroller and Auditor General of India,

ture or the grounds on which it is sanctioned. In other words, the basic concern is with the organization in which the transaction occurs, on what items money is spent and not the purpose served by it. This simple framework has not been able to stand the huge increase in and expansion of governmental outlays and functions. Though it ensures legal accountability, it was becoming obvious that as regards helping the management in the proper implementation of their developmental tasks or in enabling rational decision making with reference to policies or in a proper economic analysis of governmental transactions, it has proved inadequate. In particular, in the context of developmental planning, it has been realized that the lack of a correlation between the account and the budget heads on the one hand and the plan heads on the other has proved to be one of the serious impediments in the implementation and evaluation of plan objectives. It does not also enable one to have a proper understanding of the broad purposes for which resources are allocated or what the Government is doing in terms of its various programmes and activities under each given function. It has proved ineffective as a base for judging the progress towards the goals and targets set.

There is thus a need for modernising the accounting structure with equal if not more accent on managerial aspects. The need is particularly felt now in view of the decision to introduce Performance budgeting.³ One of the primary objectives of the technique of Performance Budgeting is the establishment of a meaningful relationship between inputs and outputs by a display of governmental transactions in terms of functions, programmes, activities and projects. Since Performance Budgeting seeks to bring out the financial and physical aspects of the programmes and activities under each functional area of governmental efforts, there is the need for a structure of accounts and budget which will focus attention on these, facilitate determination of their cost with reference to the resources deployed and help in their evaluation. In other words, there is the need for a programme-oriented classification base within an overall functional grouping in order to enable better formulation of the budget in relation to policy objectives, identification of the goals and objectives of each organisation in terms of its programmes and activities and to facili-

³ For a detailed discussion on Performance Budgeting, see 'A Manual for Programme and Performance Budgeting'. U.N. Economic and Social Affairs Deptt. of 1965 and the Report of Study Team on Financial Administration Administrative Reforms Commission, Government of India, May, 1967.

tate a built-in-system that will bring out what has been done in relation to what was programme for.

As already stated, the accounting and budgetary structure under planned economic development has a variety of objectives to serve. It is apparent that no single classification system can serve all the objectives. Different methods are to be integrated into one to serve the purposes of accountability, programme management, review and evaluation, economic analysis, and so on. In the wake of a growing awareness to bring in planning and management considerations in the structure, many Governments today have evolved new types of classification, such as functional classification, economic classification and programme and activity classification in addition to or in conjunction with the traditional object basis.

The concept of functional classification has two facets—(a) functional groupings of transactions at macro level and (b) classification at micro level by purpose irrespective of the organization. The idea is to have accounting heads grouped together in such a way that all expenditure under a given function of Government like Education, Agricultural Development, Health, etc., is available at one place for an analysis and consideration of broad issues of resource allocation and priorities. Classification by purpose is done to achieve this. Here, the total outlay under a function is what is desired without regard to who spends the money.

Under Economic classification, the purpose is to bring out the impact of the incomings and outgoings of the Government on the national economy as a whole with a view to showing how much of the National Income has its source in government activities and what extent of the capital formation and asset creation is as a result of governmental operations. For this purpose, expenditure is grouped into current and capital categories, and within each, into such heads as consumption, expenditure, transfer payments, subsidies, capital formation, etc. An economic classification in conjunction with functional groupings has immense value in decision making in the fiscal field. Many Governments are now bringing out a Functional-cum-Economic classification of their budgets either as part of the budget or as separate documents. In India too, an Economic-cum-Functional classification of the Central Budget is now being presented to the Parliament.

Programme and Activity classification is of direct impact and use to management. Such a classification into programmes suitably

broken up into sub-programmes and activities facilitates programme management and the measurement of activities at the unit level. It is in this context that accounting is referred to as a 'tool of management'. This is the crux of Performance Budgeting.

Notwithstanding a functional, economic or programme classification, the organisational-cum object basis of classification, as is being generally used in all conventional systems, is still necessary for accountability and control purposes. The problem is how to bring them all in one integrated system.

It will now be in order to have a look at the Indian system again. One of the distinctive features of the System is the extent of minute detail with which the financial transactions are differentiated and classified by organisations and items. Accounts are kept in three parts—Consolidated Fund, Contingency Fund and Public Account. The Consolidated Fund into which all revenues are credited and from which all services and supplies, whether voted or charged, are met after due process of law, is the relevant part for purposes of this paper. It has three main 'Divisions'—Revenue, Capital and Debt comprising of Public Debt, Loans and Advances and Interstate Settlement. Each Division has a number of 'Sections' comprising of what are called 'Major Heads' of account which are the main units of classification. These major heads are divided into minor, sub and detailed heads. The sub-heads constitute the primary units of appropriation. This structure is common to Central and State Governments.

The basic structure of accounts dating back to the early years of this century has remained intact for a long time. Certain changes were made from the 1st April 1937 on the introduction of provincial Autonomy. Later, some important improvements were effected during 1961-62 in order to keep pace with the Constitutional changes and to facilitate a better analysis of government transactions. Changes were made in the sections, major and other heads and a kind of semi-functional structure was evolved. By and large, the new sections reflected to some extent the broad areas of governmental services and the major heads, the departments. There are, however, a number of deficiencies in the system as discussed hereafter.

Even after the improvements made during 1961 and 1962, the major heads of accounts are still not grouped into sections on a meaningful basis. Some of the sections now in vogue do not exactly bring out the broad services or functional areas of Government.

'Collection of Taxes, Duties and other Principal Revenues', 'Debt Services', 'Administrative Services', 'Social and Development Services', 'Multipurpose River Schemes', 'Irrigation and Electricity Schemes', 'Public Works (including Roads) and Schemes of Miscellaneous Public Improvements', 'Miscellaneous', 'Extra-ordinary Items', etc., are some of the sections into which the major heads of account now stand grouped. In order to properly reflect the broad services rendered by the Government, it is necessary to recast the sections into functional areas as Social Community Services, Economic Services, General Services, and so on. Each of these broad sections could be divided further into meaningful sub-sections, as for example, Agriculture and Allied Services; Industries and Minerals, Water and Power schemes. Transport and Communications, etc., under Economic Services, or Organs of State, Fiscal Services, Interest Payments and Servicing of Debt and Administrative Services under General Services. These are only illustrative of the approach in this regard.

Certain broad functional groupings have been suggested by the United Nations Economic and Social Council.⁴ These are by way of guidelines. Different countries have adopted different functional groupings to suit their individual needs. In India too, any functional grouping of major heads into sections must take into account the requirements here. In the present set up, the section entitled "Miscellaneous" covers such diverse major heads as Famine Relief, Stationery and Printing, Opium and Forest. Apparently, a grouping of such dissimilar services under a section called Miscellaneous is a negation of functional approach. They need to be transferred to appropriate sections corresponding to the nature of the services rendered. Similarly, one of the present sections called "Social and Developmental Services" is too broad a category to reflect adequately the functional areas of governmental operations. Considering the vast differences in the nature of the services included in this section, it is necessary to split it up into two or more meaningful sections, such as Social and Community Services, and Economic Services to be suitably sub-divided further into sub-sections. Of course, a re-arrangement of the major heads of account into new

⁴ See Report of the Second Workshop on Problems of Budget Reclassification and Management in the ECAFE Region (E/UN-II BRW 3/L-2) and A Manual for Economic and Functional Classification of Government Transactions; U.N. Economic and Social Affairs, Deptt. of.

sections may involve dislocation in the position of the major heads and their numbers.

A grouping of the major heads of account to correspond to broad areas of service rendered by Government is only a part of the job. The major heads also need to be closely looked into. As far as possible, each major head of account should correspond to a function of government as well as the major spending department identifiable with that function. Already most of the important departments have separate major heads, some of which indicating the functions as well, e. g. Agriculture, Public Health, Education, Industries, etc. But in recent years, certain functions of Government have assumed added importance and new activities have come up. The organizations or departments representing these important functions of Government do not at present have major heads of account to reflect their expenditure. For example, Family* Planning would deserve a separate major head to itself. So also, the growing activities represented by specific organisations like Tourism, Petroleum and Chemicals, Foreign Trade, Fisheries, etc., should also be accounted for under specific major heads. Again, at present there are some miscellaneous major heads like 39-Miscellaneous Social and Developmental Organisations, 71-Miscellaneous and 26-Miscellaneous Departments. These have to be broken as they accommodate a number of diverse activities and organisations.

After the major heads are overhauled and grouped properly into new sections, the minor heads under each major head require a thorough shake up. Some of the minor heads of today which have grown up over a long period, have become outmoded. They do not properly reflect the present day activities of the departments. For a rational accounting structure, and specifically for Performance Budgeting, there is the need for evolving such type of minor heads as would bring out the programmes and activities of the governmental organisations. A perusal of some of the minor heads being operated by the Central and State Governments would provide interesting material. Not only do they fail to reflect the activities, there is also a surprising lack of uniformity in the matter of classification. As the minor heads have proved inadequate to accommodate the present day activities of Government, it is found that identical programmes are provided for in the budget under different minor heads in different States. For example, Plant Protection and Pest Control Schemes are classified

* A new head has since been opened.

under different minor heads, such as Agricultural Demonstrations and Propaganda including Public Exhibitions and Fairs, Agricultural Experiments and Research, Superintendence, Subordinate and Expert Staff, Miscellaneous and so on. Further, some of the minor heads cover a number of dissimilar activities. To illustrate, the minor head 'Agricultural Experiments and Research' in certain States contains provision for Plant protection, Intensive Agricultural Programmes, Seed Multiplication Farms, Vegetable Development, etc. Instances of this type can be multiplied. But these are enough to bring out the lack of uniformity, rationale and purposiveness in classifying expenditure.

✓ Recognising the deficiencies of the present accounting and budgetary structure as outlined above, the Administrative Reforms Commission appointed by the Government of India, in their Report on Finance, Accounts and Audit (1968), has made recommendations for reviewing and recasting the structure of major and minor heads of account. The Commission has suggested that the major heads of account should reflect the broad functions and major programmes of Government and that the programmes, activities and projects of the various departments and organisations should be clearly identified and the minor heads suitably recast so as to reflect these. The heads of development adopted for plan purposes are also required to be reviewed with a view to establishing a direct co-relation between the Plan heads and the account and budget heads. The recommendations of the A. R. C. bearing on budgetary and accounting reforms have been referred to a Team of Officers⁵ who are presently engaged in considering suitable changes within the framework of the Constitution. Their job is near completion.

For purposes of performance budgeting, which is agency-oriented and not with reference to each function of government, the highest level of classification is a programme undertaken by a department. Therefore, a functional grouping or a functional classification is not strictly required to support a performance budget, though the utility of such a classification for analysis and decision making is universally

Government of India, Ministry of Finance (Department of Economic Affairs) Resolution No. F. 1 (65)-B/68 dated 22nd March, 1969. See also No. 19/ARC/70 dated 18th May 1970 and No. 1-1/ARC/71 dated 30th January, 1971 from the Comptroller and Auditor General of India to all Administrative Ministries of Government of India and State Governments.

accepted. The Team of officers referred to earlier have favoured a functional classification by purpose at micro level as far as possible, in addition to a classification along functions, programmes and activities. They have favoured the idea that every functional major head should bring under it all expenditure relating to that function, irrespective of who spends the money. Thus, public works outlay on non-residential and institutional buildings related to a function is also proposed to be accounted for under the relevant functional major heads and not under Public Works heads as at present. Necessary changes in the Demands structure are also being considered to achieve this.

Ideally, all expenditure under a given function of Government or programmes within a function should be available at one place in accounts and budgets. This has not been possible so far in view of the multiplicity of departments and agencies incharge of functions and programmes and also because of the organisation-cum-object basis of classification. Schemes and projects under a programme are often executed by different organisations and the expenditure thereon lies dispersed in accounts and budget. Thus, if schemes under minor irrigation are executed by the Irrigation Department, expenditure would be available under the head of account operated by that Department. If the Public Works Department is also executing some schemes, the provision and expenditure will appear under its head of account. In practice, especially in the case of the State Governments, it is usual to come across cases where two or more departments are in charge of the same programme. In all such cases, expenditure on a programme or function now appear at different places in budget and accounts. This unsatisfactory state of affairs is proposed to be rectified by the team of officers. If their recommendations are accepted, a functional major head and the programme-oriented minor heads there under will record all expenditure relating to that function or programme, to the extent possible, at one place in the Revenue, Capital and Loans divisions.

Thus, if two or more departments are concerned with a particular function, all of them will operate the *same functional major head* of account. Similarly, when a programme is executed by more than one organisation, the organisations will operate the *same minor head* (representing the programme) within the *concerned major head reflecting the function*. It is expected that suitable accounting and funding

devices would be worked out to achieve this without encountering serious problems of accounting and fund control. In particular, under this approach, it is understood that the Team of Officers are suggesting important changes in the Public Works heads. At present, P.W.D. major heads include works of all kind—residential, non-residential/institutional buildings and roads. It is proposed to rationalise the heads by having distinct major heads for Housing and Roads. These are to be placed under appropriate functional groupings or sections, viz., Social and Community Services and Transport & Communications. Construction outlay relating to non-residential and other institutional buildings or other structures relating to various functions is proposed to be provided under the relevant functional major heads against the concerned programme minor heads. These heads, to the extent the provision relates to works to be done by the P.W.D., will be appearing in the Composite Demand of the P.W.D., who will be responsible for getting the funds, operating them and controlling them. This will avoid funding complications, but will ensure booking of expenditure on functional lines. It remains to be seen how far this scheme will run smoothly. Concrete details of the proposal, in elaboration of their earlier suggestions (vide circulars dated 18-5-70 and 30-1-71) are reported to be under finalisation. Construction outlay relating to general office accommodation, general services, etc. and common facilities like T & P, etc. will, however, be accounted for under a separate head called 'Public Works'.

If, however, the above scheme of strict functional classification were to run into practical difficulties, one possible way would be to have a meaningful programme and activity classification under each major head of account, which, as mentioned earlier, will primarily co respond to a function, and to a large extent, the department identifiable with that function. Cases where more than one department is involved in one function would be rather few like the Public Works Department or in the Agriculture Sector. Even where more than one department executes schemes under a programme within a function, funds could be provided for and expenditure debited against the respective major heads but under minor heads having the same nomenclature. Thus, for example, if agricultural extension schemes are executed by Agriculture and Community Development Departments, both the departments will operate their own major heads, but there could be identical minor heads having the nomenclature, say, 'Agricultural Extension' in both the major heads. If similar programmes

and activities have the same nomenclature in the scheme of programme and activity classification, there will be no difficulty in identifying them and adding up the figures from two or more places. A strict functional classification can thus be avoided, if it means avoidable complications. What is needed is a proper functional grouping, assignment of major heads by functions/departments and a programme and activity classification for each department identifiable with a given function.

Two points have to be borne in mind in devising and implementing changes in the accounting structure. First, any reforms should conform to the constitutional requirements as regards the presentation of budget for approval by the Legislature and should not in any way result in whittling down Legislative control. Statutory requirements regarding the functions of audit have to be kept in view. Secondly, the heads of accounts are dealt with by a large number of officials including lower division clerks in Departments, Treasuries and Accounts Offices. It is essential that the heads of accounts are not changed frequently, as otherwise, there would be widespread confusion in classification and compilation of accounts. In determining minor heads to reflect the programmes and activities, it should also be remembered that programmes which are important and are of a long term character alone are allotted separate minor heads and that purely temporary programmes should be grouped under convenient minor heads, to avoid frequent changes in the account heads.

A Case Study of the structure of minor heads under the major head 31-Agriculture was conducted by the Working Group on Performance Budgeting (set up by the A.R.C.) in consultation with the officers of the Departments of Agriculture and Finance as well as the Accountants General of three States and a new pattern was suggested for minor heads to correspond to the activities of the Department of Agriculture. These could be seen at pages 49—53 of the Report of the Study Team⁶ on Accounts and Audit. These are not final but only indicative of the approach. Annexure to this paper shows how the accountability and management aspects could be integrated in one set of accounts. It may be seen there from that except, perhaps, for economic classification, the structure will satisfy all other requirements. Economic classification could be built up by suitable

⁶ See Report of Study Team on Account and Audit, Administrative Reforms Commission, Government of India, September 1967.

interpretation, re-classification and analysis of the data.

Accounting being essentially a management function, there is imperative need to develop accounting competence within the Departments and organisations to aid management. The manner in which detailed departmental accounts will be maintained and the type of data that should be generated are matters to be worked out in detail by each Department in consultation with Finance. At present, the departments are found wanting in the maintenance of even the basic records and accounts to ensure financial control with reference to appropriations, though they are required to do so and reconcile their figures with those kept by the Accountants General. The Administrative Reforms Commission has commented on this. They have envisaged a system under which the compilation of Central accounts will continue to be done by the Comptroller and Auditor General, but with minimum details, and the detailed accounts will be developed and maintained by the departments themselves to assist their managerial performance. At present far too many unnecessary details by items go into the budgets and the consolidated accounts kept by each A.G. There is a need to make the Demands for Grants and the Central accounts broad-based. This question is also being examined by the Team of Officers referred to earlier.⁷

As in the case of systems of classification, there are different ways of recording government transaction, each serving distinct purposes. The different ways of accounting can be traced to the different time span of transactions. There are four main stages: (a) placing of orders or making a commitment; (b) receipt of goods and services; (c) disbursements for the goods received, supplies made or services rendered and (d) the use of goods and services. Corresponding to these stages there are four main methods of accounting *viz.* obligation, accrual, cash and accrued cost.

All the above bases are significant and have their specific uses. In a majority of countries including India, transactions are recorded on a cash basis. Its chief merit is that it enables a determination of total incomings and outgoings of cash as also an assessment of the impact of the expenditures on the economy. Although the cash basis of accounting has only limited use to planning in the implementation and appraisal of programmes, it has the important

⁷ The team has since submitted its first Report on Reforms in the Demand structure and elimination of details.

merit of being ideally suited for financial and monetary analysis, for appreciating the budgetary position in terms of surplus and deficit budgets, etc. For most of the administrative type of governmental expenditures where substantial expenditure is in respect of salaries and allowances, cash accounting would be quite adequate. It is however, not suitable for measuring progress of capital projects since most of such projects are spread over a number of years and cash disbursements during a particular year would often tend to inflate their cost with reference to the work done in that year. Similarly, it will not be quite suitable for the commercial, industrial and trading activities of government. Under cash accounting, transactions are recorded only when the disbursements for goods and services are made irrespective of the time when they were ordered or received or consumed.

Under the obligation approach, transactions are recorded when orders are placed or commitments made without regard to the fact as to when the goods and services are received or paid for or consumed. Such a method in combination with cash basis has some relevance for appropriation and found control, but has only limited value for most of the governmental transactions including projects. The ordering of the goods or services though involves a commitment, does not mean much in real terms so far as governmental activities are concerned or the execution of programmes and projects.

Under the accrual basis, transactions are recorded when the goods and services are received even though they might not have been paid for or consumed. Under this approach, cognizance is taken of inventories, prepaid items, outstanding charges, etc. This kind of accounting is generally used in transactions involving purchase and sale of commodities, construction and operation of projects, and generally in the activities of a commercial nature.

An extension of the basis of accrual accounting is accrued costing under which the total cost of a given programme or project is recorded so as to bring together all legitimate cost pertaining to a particular scheme or project incurred during a given year, inclusive of all direct and indirect charges. Such a basis of accounting for the total cost enables the working out of unit costs.

The abovementioned types of accounting have different utility in different circumstances. In selecting an appropriate method of accounting, due consideration should be given to the needs and requirements of the situation, availability of suitable trained personnel

and resources. For a major part of governmental transactions, the existing cash basis of accounting will be all right. However, in course of time, accrual basis of accounting will have to be developed in respect of industrial, commercial and trading activities of Government. Accrual accounting is not a pre-requisite for performance budgeting in respect of the usual governmental services.

Performance Budgeting needs to be sustained by timely accounting and physical data. The work of accounting reforms taken up by the Team set up by the Government of India is expected to be completed early. With new heads of account, the structure of the Demands for Grants submitted to the Legislature for obtaining its vote/appropriation will also become more purposeful. In the absence of the needed accounting changes, the performance budgets being prepared and presented now are only additional supplementary documents to the conventional budget. In fact, if accounting changes are brought about as discussed earlier, more than 50% of the work towards introduction of performance budgeting may be said to be over. All that will be needed then is the gradual development of techniques and methods of measurement of physical performance so that cost of individual programmes and activities could be related to work to be done or services to be rendered. For this purpose proper studies of each Department/Organization are needed and appropriate ways devised to select work units, develop data and formulate norms and yardsticks. A meaningful Information and Reporting System is vital in this connection. It may be mentioned here that even under performance budgeting, the Demands for Grants (following the revised account heads) will continue to be the basis for legislative sanction. Performance budgets will form an integral part of the Demands. In other words, for each Ministry/Department, there would be separate volumes in which the first part will be the Demand (as rationalised) and the second part will be the performance budget. (See in this connection, the first Report of the Team submitted with Shri A. K. Mukherji's D. O. No. 158-ARC/31-71 dated 16-10-71 for further details). The Demands for Grants, as proposed to be rationalised, and the performance budgets will together constitute the budget proper in future, as and when final decisions are arrived at on the Team's recommendations.

ANNEXURE

Integrated Classification Structure—An Illustration

Social Services (Broad Sector or service area)	
Medical & Health Services (Sub-sector or functional area)	
Public Health (Department ; Function ; Major head)	
Control of Communicable Diseases (Programme ; Minor head)	
Directorate of Communicable Diseases (Organization ; group head)	
Establishment Charges	} (Objects of expenditure ; Sub-heads ; Units of Appropriation)
Travel Expenses	
Contingencies	
Stores & Equipment,	
Grant-in-aid, etc. etc.	
Malaria Eradication programme (Sub-programme , group head)	
Officer-in-charge, M.E.P. (Sub-organization, Sub-group head)	
Establishment charges	} (Objects of expenditure ; Sub-heads ; Units of Appropriation)
Travel Expenses	
Contingencies	
Stores,	
etc., etc.	
DDT Spraying	(Activity ; Sub-group head)
Establishment Charges	} (Objects of Expenditure ; Sub-heads ; Units of Appropriation)
Travel Expenses	
Contingencies,	
etc. etc.	

- Note :* 1. To what extent details should be exhibited in the Demands for Grants has been dealt with by the Team of Officers in their first Report on Demands for Grants submitted to Government in October, 1971. They have suggested some financial limits.
2. The Team has also attempted a standard list of objects of expenditure, i. e., sub-heads.

4

WORK-LOAD AND WORK MEASUREMENT

M.J.K. THAVARAJ

SOME work naturally is not measured. There are certain types of work which one should not attempt to measure, like policy direction which does not lend itself to measurement. Likewise it is futile to attempt to measure in certain areas, *e.g.*, where statutory provisions exist about certain Boards, their constitution—if the Board is to consist of nine people, there is no point in trying to measure the work of each. Similarly sometimes there may be a prescribed proportion in terms of numbers of an officer and his personal staff. Unless a new decision is taken in regard to the proportion of personal staff then there is no point in attempting to measure that. Results of certain type of activities like research are unpredictable in terms of their worth which cannot be quantified. Certain type of research however may lend itself to quantification.

There is also the particular set-up which requires that there should be a Registrar's Office in every taluk. That is to say an area of coverage is laid down, without any relevance to the volume of work. May be certain areas are critical with lots of transactions taking place. There can be certain other areas where such volume is not so hard and there may not be enough transactions taking place. Yet if we provide one office for every 50 villages then certain officers will be going without much work. If one wants to reformulate the policy, then the measurement of that again would be for determining the number of officers for 5000 or 1000 of the population.

In installing any system of measurement, it is axiomatic that there should be the fullest cooperation of the operating Department without which it will be an impossible task. Any attempt to introduce measures from above without any cooperation and involvement of the operating agencies may not always lead to desirable results.

It is true that not only performance budgeting but even good management requires good records and reporting assistance. A good record and reporting system should, as far as possible be based on measures and quantities in private undertakings which run smoothly and efficiently and which would have formats and designs capable of generating the desirable data for proper management decisions even irrespective of whether they have performance budget. The operating departments first of all should have full description of the work performed in each activity. They should first of all seek to describe each activity and then in each activity they may be able to indicate guidelines on past volumes or works, as regards how much was done in the past and how much was being done and how much was planned to be done. So this should follow a full description of the activity they are undertaking. This will help certainly forecasting their work, and for scheduling the things over the month to facilitate control of operation in terms of what were scheduled. It should be the responsibility of the operating department to provide this for itself. Then internally also the Department should provide for a good reporting system. They record the operations or implement them, formulate the budget but sit back on it. Such a system will not serve as a management tool. At best it could become a tool for proper budget scrutiny vis-a-vis the Ministry of Finance or the Central Budget Agency. If we are to serve the needs of internal management then, record keeping and reporting and review at different levels, become essential management requirement. There should be provision for this kind of procedure.

Yardsticks may be evolved on the statistical analysis of the operations of any agency. If it is the Tax Department, may be a particular tax office may be handling 1500 cases. Alternatively it is known by historical records for the last many years that so much has been the rate of growth of works ; current volume is then estimated or else some work sampling may be done to estimate the work and of course the Cost Accountant can provide much better yardsticks of measurement. Sometimes it is possible with the help of the Statistician, the Engineer or Cost Accountant, to determine the time that would be taken for a particular operation. Pre-determined time that

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may be taken in an operation may help to measure the volume of work.

In choosing the units of work measurement or yardstick, certain qualifications have to be kept in view. The yardstick properly reflect the ambitions or objectives of the organisation. If one of the activities of the Roads Wing is the provision of "Missing Links" then the number of miles of missing links provided or arranged should be the proper yardstick. The yardstick should fully reflect what the agency is trying to do and it should also, as far as possible, be fully reflective of the utilisation of the resources. Now in an organization where only manpower is used and there is very little equipment, it is good enough if one assesses the volume of work in terms of man-days or man-years. If it has other components, then of course, it should reflect the inputs properly. It may be unit cost or some other measure. Then just for the sake of a yardstick one should not go in for expensive, complicated methods. As far as possible it should be suitably accountable and capable of lending itself to added performance.

There are various types of yardsticks. The most popular is performance ratio, otherwise known as the work unit concept. It tries to relate the volume of work, performed and the manpower utilized in producing the volume of work, and when the volume of work is difficult to measure in terms of units of work, the manpower or man-hour becomes the input. The standard is expressed in terms of number of units per man-day or man-hour or number of man-days or man-hours involved in producing one unit whichever may be the way. In a casting unit if there are different types of things cast, may be 4 or 5 different types of things coming out of the same group of operating people and same unit of production and same equipment and machinery, then a thorough and careful study and analysis will have to be made to find out how much time a product takes to be cast, before evolving suitable weighted unit performance ratio.

There may be another type of standard or yardstick which is called 'related staffing pattern.' Now there are certain primary functions like those of the doctor or surgeon. It may be that the surgeon is supported by nurses and attendants, whose proportion is functionally required. In such a case it is not necessary to examine the volume of work involved. So long as initially this kind of requirement is regarded as technically necessary so that the doctor may function effectively and efficiently, then we need not go into the rest. It is primarily a function of the number of surgeries a doctor can do.

Working this out and the volume of work involved, may help to determine how many surgeons will have to be in rotation or in operation. This is an example of related staffing pattern in this case the doctor-nurses ratio. One could also probably think of another standard, like 'manning the table'. For example, there may be the fabrication of boiler which will require a stationary fireman; or certain other functionaries, say, to attend to a blast furnace. In 8 hours molten steel is poured out. There has to be somebody all the time looking at the furnace. It might be necessary to throw in certain chemicals to facilitate the process of melting and when the molten thing is ready, technical personnel should be available before it is poured and when it is poured certain things are to be attended to. One can therefore think of the required time and the required number of people to carry out specific operations so that there is the minimum requisite manpower to man that particular operation. 'Manning the table' can provide the yardstick for measuring the volume of work involved, therefore the composition and number of hands required.

Now the other easier thing is the yardstick based on the number of cases allotted. This is possible in the case of Tax Officers, Inspecting Officers, Inspectors and similar other personnel. Prescribed yardsticks, say 200 cases for Income Tax Officers or 500 cases for Sales Tax Officers could be applied.

Now the qualitative aspect. Somebody settles a case. There may be more details arising out of an assessment. One has to also keep a watch on the quality so that the turnover in the case of many operations gives indicators. In the case of manufactured articles or standardised operations, there is the evident measure. It covers all cost and it fully reflects inputs used and at the same time it is possible to compare unit cost. Comparison is one of the valuable things where the process is repetitive, standardised and routine. Where it is not, unit cost will be of limited value. In manufacturing plants one has to have costing as a pre-requisite for arriving at yardsticks. Without proper allocation of overheads it will be an inadequate standard to go by. The term 'unit cost', sometimes conjures up a vision of highly technical cost accounting procedures. Unit cost concept is applied where it is necessary and it does not require any rigorous standard in ordinary areas of operation.

Quality may suffer if adequate steps are not taken to preserve quality or improve quality, but it is the responsibility of the line management. The problem of quality is not of measurement but one

of management. Just as it is not possible to ensure quality in a school without proper inspection and supervision, quality cannot be ensured in any other operation without proper inspection. The system of inspection and management is not done away with because of the introduction of performance budgeting. Suppose an agency wants to attempt an improvement in quality and for what reason it needs additional staff, then it is its responsibility to show that has been the level of quality before and in what ways it seeks to improve it and how in doing so it needs extra personnel. But this is not a very easy thing to do. Quality is not easily measured excepting in highly automatised processes. In Rourkela Steel Plant where oil pipes are made, there are so many technically automatised processes by which the tube is tested to conform to the highest standards and whatever is rejected is used for other purposes and sold at lower prices. If in the course of working a plant or operation one finds that the rejects increase in volume as a proportion of the total volume of production, it may be a sign of deterioration in the quality and some attention will have to be paid to locating where deterioration takes place, and identifying which operation is responsible for the deterioration. Even with the workload measured and the inputs ascertained in terms of the yardsticks, other factors operate which affect the volume of work or the performance. Suppose a Tax Officer has a lot of backlog of work. The proper measure of the backlog along with the current work load will have to be taken into account. Performance is affected by organisational procedures and changes arising out of certain other techniques like Work Study and Time and Motion Study. These are complementary in the total picture of improvement of performance. Then sometimes the performance will also depend upon the area of operation, say as in the case of the agricultural officer, in whose jurisdiction there may be an area with a good deal of paddy land and also hilly areas with cardamom or rubber plantations. In such a case to move from one plantation to another through all types of undulated territory may mean an enormous exercise and transport may not be available. Determining the work-load then in relation to the volume of work, is not easy and has to be done with care. Administration of controls presupposes a level of understanding about what goes into all the administrative operations. In the case of farm practices, such understanding should include, say, various protective measures and land uses, number of hectares managed, conservation steps taken, area and extent of land, number of foresters (in the case

of forests), number of hectares planned, number of hectares protected etc. Similarly regarding the Education Department, for every type of education, students enrolled and for library extension service, number of books catalogued, classified and processed give a measure of respective operations. In the case of tax administration, tax rulings and other legal rulings issued, tax assessments, tax returns processed and or assessed, tax cases processed or assessed, tax investigations conducted etc., help in evolving units of measure. A lot has to be done on each operation to evolve the unit of measure.

Then for a firm analysis of performance, it may be set out by quarters. In the first quarter, volume of work, man-days, performance rate and number of physical areas are given. Also given could be data regarding what has happened in the preceding year or two years before. What is happening this year can be compared with what has happened in the past two years and this is also a quarterly assessment of the performance. Performance rate can also be compared with the past performance. Performance analysis may be showing some improper or under-utilisation of personnel; excess work-load or backlog accumulated between two different inspection officers; inadequate distribution of work; procedural defects which may have to be rectified. Above all, the analysis of performance provides the means for taking decisions of different kinds, for establishing budgetary policy, or for policy governing the various operating programmes and so on. Apart from internal management it helps to formulate the budget scientifically based on volume of work and performance rates and then the budget justification becomes easier. Any cut made is in terms of cuts in certain operations of the work scheduled to be undertaken and in that way it facilitates the echelons to review the budget operations properly in a meaningful manner.

5

PERFORMANCE BUDGETING
FOR
CAPITAL PROJECTS

E. R. K. Menon

MANY important projects form part of our plans and the management of these projects is of great importance in the successful implementation of the plan. The capital project, which has a gestation period, is different from a current programme activity, which usually runs for one year. Management is best when we are able to look ahead and plan in a regular and systematic manner. Budgeting is organized primarily at present as a financial rather than an administrative or programming process. The performance approach to budgeting employs advance planning and control system which has proved useful. The system involves—

- (1) Advance planning and estimation ;
- (2) Examination of immediate and future financial needs ;
- (3) Control of funds ;
- (4) Review of work in progress ; and
- (5) Reports on performance.

The technique of performance budgeting for a capital project brings together the separate elements of an integrated system. It enables us to organize the work in a systematic and scientific manner.

It helps to provide information for the efficient and effective conduct of operations.

Scrutiny of Projects

Before dealing with performance budgeting for a capital project, a reference may be made briefly to the procedure for scrutiny of project proposals. When the Five Year Plan is framed, the Plan includes the projects which have to be initiated during the period of the plan, but in some cases new projects might also be considered during the Plan period. There are various steps which have to be gone through before a project is sanctioned. It is essential that initial examination and investigation should establish the need for investment in a particular project. A feasibility study is undertaken after this need is established. The feasibility study consists of two parts, technical feasibility and economic feasibility. The value of benefits to be gained or the financial return from the project should be ascertained.

Location, Economic size of the Project

Sometimes we may have to consider two or more sites. Once a feasibility study has been accepted and investment approved in principle (this includes also the foreign exchange requirements for the project), the administrative authorities can go forward with the proposal. A suggested outline of a feasibility report may be seen in the Annexure.

Detailed Project Estimate

If the feasibility study is as detailed and covers all the points usually prescribed, then there is no need for a detailed project report ; if not, a detailed project report has to be commissioned. This will give a detailed cost estimate covering the various elements constituting a project report. In the preparation of this estimate, it will be useful to assemble data regarding unit cost of materials, equipment, machinery, etc. The suggestion to have a Data Bank of the costs of items from past projects, taking into account location, soil, etc. has been made by the Administrative Reforms Commission in their report on Public Undertakings.

The components in a detailed project estimate will vary from project to project. To give some examples, in the case of an irrigation dam project, the components are usually diversion works, dam-embankment, spillway, outlet works, etc., while for example in a P&T auto exchange project, the components are land, building, apparatus and plant, cables, etc. It need hardly be stated that badly planned and

incompletely prepared estimates land us in trouble. All projects should, therefore, be adequately analysed and in particular, the estimated cost must be as accurate as possible. This estimate is of significance in the programming process, because it identifies the features of the project, the major components, the physical measures wherever possible, a split-up of cost, by labour, materials and services, etc.

PERT

In view of the complex nature of a capital project, modern techniques like PERT have to be applied. This is a scientific way of planning and controlling a project in the construction industry. PERT was developed by U.S. Navy for Polaris Missile Project in 1958. The Critical Path Method (CPM) which is conceptually the same was developed by Morgan Walker of Du Pont for Du Pont Chemical Works in 1957.

According to this technique the principal tasks to be performed should be identified first. A work break-down structure is prepared breaking the project into its main components, sub-components etc. Thereafter, all the tasks are defined and arranged in their sequential order taking into consideration their sequential relationship and their inter-dependencies. The components which make up a net-work are events and activities. An event is a special accomplishment in a work plan which is recognizable at a particular instant of time. Key events are occurrences of major action and are known as milestones. This gives an integrated management system and identifies well in advance, the principal problem areas and it provides an effective tool for controlling the project by applying the net-work scheduling. The tasks which are to be attended to first are executed before the others. A Master Control Chart which is the critical path is prepared which gives important tasks to be performed and arranges them in a logical sequence for the completion of the project.

Control Schedule

After application of PERT net-work scheduling, it will be possible to lay down a schedule indicating the various tasks to be performed during the construction period. When the time factor is added to the project estimate, a control schedule for the project can be prepared which, in brief, gives the total cost of the project, the annual break-down of the estimate for different years, the financial requirements in terms of components and the estimated completion date. The control schedule is the key stone of the performance

budgeting system for a capital project. It provides the planning, programming and budgetary basis. It enables the management to take decisions on long-range programming, preparation of the annual budget and execution of the approved programme of work for the budget year. It helps in determining the future financial commitments and also in the material management because the materials which will be required in different years could be ascertained from the control schedule. These materials could be ordered in advance and procured taking into account the delays involved in delivery. The control schedule may have to be revised subsequently, if the estimated cost of the project undergoes a change.

Short-term objective and development of work plan for the year

The first step in the programme control for the year relates to the development of the work plan for the year. In planning our operations, it is necessary to establish a concrete programme of work covering a definite period of time which is usually one year. Within the framework of our long-term goals and plans, the annual plan of action has to be fitted in. Programme Statements have to be drawn up in respect of each component, the physical content of the programme identified and information given in a narrative explanation as to the financial requirements for the year. The development of the work plan in as much detail as possible and in as clear and identifiable terms as possible, is an important step towards the effective control of the programme.

Budget Presentation

The budget presentation gives the financial requirements for long-range planning as well as the financial requirements for the budget year which is a part of the long-term plan. The authorized projects are shown as activities and their financing needs are also indicated. This is followed by a brief narrative of the work plan for the year. The physical targets, wherever available, should be given.

For top level review purposes, the budget presentation thus furnishes several types of useful programme and financial data.

Progress reporting, control and monitoring of work

After we prepare the performance budget, the follow-up-action is important. By the preparation of a performance budget it should not be understood that further action is no longer needed. Progress on reporting is an important aid which can be used with advantage at all levels of management. In reviewing the progress of a project, the same emphasis is not often given to physical progress as is being given to

financial expenditure. It is, therefore, necessary to have a system of comprehensive progress reporting which would provide an invaluable tool to alert management when things go wrong and the project is not keeping to the schedule.

The progress report will consist of two groups viz ;

- (1) Financial, from the Accounts ; and
- (2) Physical, from Engineering Officers.

The programme for the year, as set forth in the budget presentation, identifies the work that is approved to be carried out. Information should be supplied in respect of the component of key elements of the project or further sub-divisions under them. Where PERT net-work schedule has been applied, progress reporting can be with reference to the net-work schedule. The details should cover the extent of provision in the sanctioned project, extent of the work done upto the date of review, compared with the programme to be accomplished. In addition to the details regarding the physical progress of work, the progress of expenditure should also be obtained in terms of items given in the budget. It is necessary to find out how far the expenditure incurred compares with the physical targets achieved. Where there are marked differences, the reasons for these should be found out and corrective action taken.

Financial Management

The preparation of budgets and their periodical review forms an important tool of financial management. For undertaking this managerial responsibility, budgets should not be merely used as instruments for obtaining funds but should be viewed as a plan for action. In this connection, it is important that the components of the capital projects are all well defined so that they could easily be identified and control over expenditure exercised during execution. The budget heads should be the same as in the project estimates, so that actual expenditure obtained from the accounts could be compared with the project estimate. If the same classification is not adopted, production of timely financial data may be difficult. In those cases where contracts are given for certain items of work in the project report, the project cost could be arranged to show costs for those items which are given on contract, the remaining items being shown separately. The report should compare the estimated cost of each major component of work with the actual cost of each to the date of report and the project cost of the completion of the project. Thus it will be possible to forecast in advance, if the projected cost will exceed the estimated cost. Cost overruns will ultimately affect the economics of the project and so every effort should be made to avoid this.

ANNEXURE*

Introduction

Provides a brief summary of the contents of the feasibility report and will give information on the size of the project, location, markets it will serve, cost and potential profitability.

History of the Project

- How the project originated
- When analysis first started
- What analytical steps were taken prior to this report.
- Present position of the organization sponsoring the new project.

The market prospects

If product is to be sold indigenously, the report should provide data for last 7 years on :

- Present imports, quantities and costs
- Domestic production
- Exports
- Domestic consumption
- Prices
 - factory
 - wholesale
 - retail
 - imported prices
- Duties and taxes payable on the product
- Import restrictions that may affect sales.

If the product is to be exported the report should provide data on :

- Proposed overseas markets
- Possibility or reciprocity on similar goods from foreign markets
- Data for each foreign market as on indigenous markets above.

Plan Requirements

Outline the requirements made in the current five year plans under which this project will be developed, or the tentative requirements for the forthcoming plan. Show how much of this required

* Memorandum on Feasibility Studies for Public Sector Projects : Planning Commission.

capacity has been filled and to what extent the proposed project will fill the gap.

Pattern of Demand

Provide data supporting estimates on the quantities and broad locations where product is to be sold.

Competitors

List for all major competitors —

- Volume of business
- Capacity
- Capability of expansion
- Plans for expansion (if known)

Give similar data for foreign competitors if product is to be exported.

Competitive Position

Perhaps only partially applicable for public sector projects. However, delineate those advantages that this project has over existing plants. May be —

- Raw materials are closer, or cheaper
- Nearby markets
- Advanced technical processes utilised.

Give similar data for foreign competitors if product is to be exported.

Technical data

Provide information on :

- Product/s
- Processes
- Special foreign know-how or processes that will be used.
- Quantities to be produced
- Raw materials
- Labour requirements, by gross skills
- Transportation data
- Major power or fuel sources
- Provision for housing
- Layout of plant.

Preliminary Economic Comparisons on size and Processes

The choice of the size and process to be used, provided the technical aspects are satisfactory, is based on an economic comparison of available alternatives. Details of any of these comparisons

should be included in the Feasibility Report, irrespective of whether the outcome of the comparison affected the final decision on size or process.

Location of Project

A resume of the different locations that were studied and the reasons behind the final selection. All economic comparisons that were undertaken during the location studies should be included in this chapter irrespective of the site finally chosen.

Project Estimates

Construction Cost

Provide data supporting a tabular estimate

Working Capital

Provide data supporting a tabulated estimate.

Financial Structure

Provide an outline of existing arrangements in financing the organization and the share that this new project requires.

Earnings Forecast

Provide data supporting the forecast of earnings.

Cash Flow Estimates

Provide a brief summary in tabular form of the annual expenditure during construction and the first few years of operation, and the sources of cash to meet these expenditures.

Balance Sheet

Provide forecasted balance sheets for the first six to ten years of operation.

Profitability of the Project

In addition to providing an estimated return for the project for the first few years, calculate a profitability index for the project.

Benefits to the National Economy

Outline the benefits accruing to the nation through this project. Possible benefits may be :

- Savings in Foreign Exchange
- Earnings in Foreign Exchange
- Associated increase in industrial skills in region, or in the nation
- Reduction of regional unemployment
- Development of a vital national industry.

Also present in tabular form an outline of the earnings to the nation as a whole and compare with commercial profitability.

6

NETWORK PLANNING AND SCHEDULING TECHNIQUE

C. S. Parthasarathy

OVER the past few years, the Network Planning and Scheduling Technique has developed under a variety of names, largely in the construction and defence industries. The two most common types of the network technique are the Critical Path Method (CPM) and the Programme Evaluation and Review Technique (PERT).

Historical Development

The Critical Path Method was developed in U. S. A. in 1957 by Morgan E. Walker of E. I. Du Pont and James Kelly of Remington Rand. It was first applied when the network analysis was compared with conventional methods of Scheduling in the construction of a new chemical plant by Du Pont. Later it was applied to an overhaul and maintenance shut-down at one of the Du Pont works. In fact, Du Pont had experienced considerable losses because of the stoppage of production during regular overhaul and maintenance of some of their vital plants. In order to reduce such losses in production the CPM was developed and applied to schedule such overhaul maintenance. The CPM is credited with having reduced the shut-down period from 125 to 93 hours by better analysis through the technique. Expediting and improving labour performance on critical path activities further cut down the shut-down time to 78 hours. This improved performance meant an increase of a million pounds of production.

Programme Evaluation and Review Technique

PERT was first developed in 1958 by the U.S. Navy's Special Projects Office and a management consulting firm, Booz Allen and Hamilton, to provide for the integrated planning and control of the Polaris Missile (Weapon System) Project. The problem faced by the U.S. Navy was to co-ordinate the efforts of the hundreds of agencies responsible for this project and PERT was developed and used to meet this situation. As a result of its application, this technique is credited with the distinction of having reduced the overall project time by as much as two years, i.e., the project was completed two years ahead of the initial schedule.

Comparison of CPM and PERT

Although both PERT and CPM were developed independently by two different organizations, over a period of years the differences between them have narrowed down. Now they are more or less very similar and are commonly known as the network technique.

The CPM networks are 'activity-oriented', emphasising the description associated with activities in a network. On the other hand PERT networks are generally 'event-oriented', placing the emphasis on descriptions associated with events. Generally speaking, while activity descriptions on the network may be better suited to operating level personnel, even descriptions, particularly on master control networks, would better meet the requirements of top management who are largely concerned with the actual or prospective accomplishment of major or significant tasks in a project.

In actual practice, however, a combination of event and activity descriptions is used in the same network as may be considered necessary or warranted by the demands of a particular situation depicted on the network.

Objectives of the Network Technique

The term 'Network Planning and Scheduling Technique' refers to the method of programming or project planning, scheduling and control. The network technique constitutes an important step towards integrated management system. A project manager needs an integrated management system for :

- (i) Detailed and integrated planning of the project task to be accomplished ;
- (ii) Developing realistic schedules ;
- (iii) Exercising effective control which :
—requires periodic checking and evaluation of progress.

and comparing it with the plan ; and
 —involves projecting the effect of the current progress on the project completion time and taking any corrective action required in time.

- (iv) Optimum use of the available resources in men, money and materials.

The network technique with its associated analysis satisfies the above requirements of an integrated management system.

Relationship of the Network Technique (PERT/CPM) to Other Planning and Control Techniques

Before proceeding to explain the basic principles and mechanics of the Network Technique, a brief review may be made of the evolution of the traditional planning and control techniques. This will serve as a background establishing the need for search of new methods, and to bring out the advancement of the network technique over the traditional methods, and the contribution of this technique as an aid to management. The more important of the conventional planning and control methods in use are :

- Gantt Chart
- Milestone Chart
- Flow process Chart
- Line of Balance Chart

These techniques are briefly described below :

Gantt Chart

Prior to World War I, the U. S. Army Ordnance Bureau desired an improved method of planning and controlling the production of ordnance material by Government arsenals and private industry. In pursuance of this, Henry L. Gantt, a consultant at Frankford Arsenal, designed a simple chart which could display the schedule as well as make a comparison between actual performance and the schedule. Fig. 1 shows a typical Gantt Chart displaying the schedule of a small building project with the help of bars drawn on a time scale. Henry Gantt suggested that periodically the portion of a bar could be shaded to indicate the progress made at the time of reporting. For example, Fig. 1 shows that on August 31, the mechanical equipment work is ahead of schedule ; the electrical equipment work is behind schedule ; whereas the building construction is on schedule! Thus, the Gantt Chart not only showed the schedule, but was considered a good method of reporting the actual progress and comparing it with the schedule.

This chart, however, has been found to be deficient in some respects. The chart does not indicate the effect, on the project completion time, of some work being behind or ahead of schedule. Thus, in the given illustration, it has not been possible to know whether the mechanical equipment work, which was ahead of schedule would compensate for the electrical equipment work which was behind schedule; and whether the project as a whole would be completed on schedule or be delayed. This is so because the Gantt Chart does not show the dependencies or relationships between the various project tasks or activities.

Secondly, reporting with the help of this chart involves estimating very broadly how much of the total work is completed. At best, the estimating could be in terms of percentages i.e. 25% to 30% of the total work is completed, etc., but such reporting does not give an idea as to what exactly is completed and what is not, the reason being that the Gantt Chart does not show any milestones or events in between the horizontal bars.

However, the Bar or Gantt Chart system of planning and scheduling is still widely used by many organisations because it is simple and can be easily understood.

Milestone Chart

The Milestone Chart which was considered to be an improvement over the then existing Gantt Chart was developed around 1940. Basically, the Milestone Chart is very much similar to the Gantt Chart except that it has introduced the concept of events or intermediate milestones which are inserted along the task or activity-oriented horizontal bars as shown in Fig. 2. As a result, this chart makes reporting more definite by virtue of the identification that can be made with these positive milestones.

However, this chart also does not exhibit the dependencies or inter-relationships among the various tasks and thus has limited predictive value. It cannot indicate whether the total project would be delayed or not as a result of schedule slippage in one of the milestones during various stages of the project construction.

Flow Process Chart

These charts exhibit the sequential relationship of activities or inter-relationship between tasks. These were developed by the contemporaries of Gantt, the Gilbreths. The process charts are used for :

- work simplification,
- method improvements, and
- procedure analysis.

These charts provide an easy and effective means of communicating a plan and constitute a simple, concise graphic presentation on one single sheet of paper, as shown in Fig. 3. Thus Flow Process Charts made, in a sense, improvements over Gantt or Milestone

Chart, as they exhibit relationship between activities and also contain events or milestones.

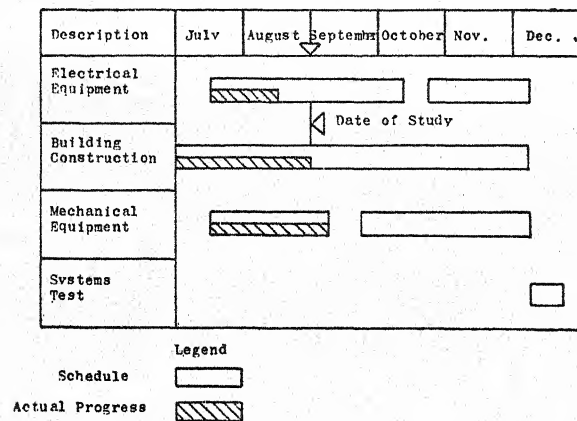
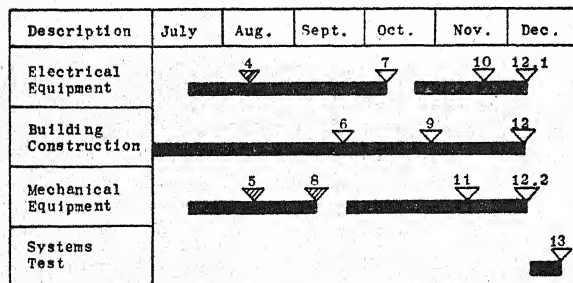


Fig. 1. Gantt Chart : Schedule for a Building Project.



GLOSSARY OF MILESTONES

ELEC. EQUIPMENT	BUILDING CONSTN	MECH. EQUIPMENT	LEGEND
4. Order Elec. Equipment.	6. Complete Fdns.	5. Order Mech. Equipment	Scheduled Milestones.
7. Receive Eqipt.	9. Const. Superstr.	8. Receive Eqipt.	
10. Instal Eqipt.	12. Munt Bldg.	11. Instal Eqipt,	
12. 1. Test Equip-ment.		12. 2. Test Eqipt.	
		13. Systems Test	

Fig. 2. Milestone Chart : Schedule for Building Project.

However, the flow process charts do not provide information regarding time durations of individual activities, and as such they do not help in determining the project schedule; nor can they help in predicting the completion time of the project.

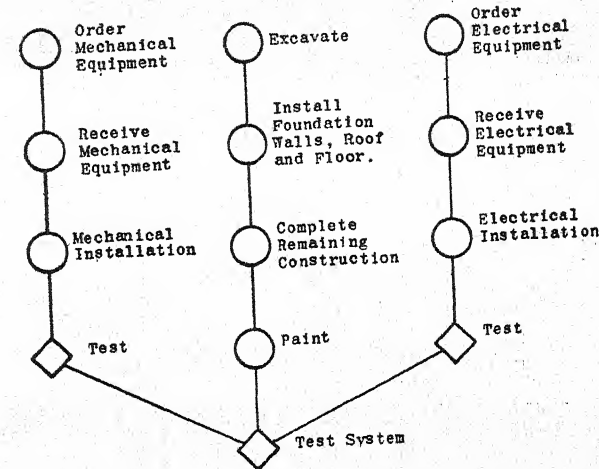
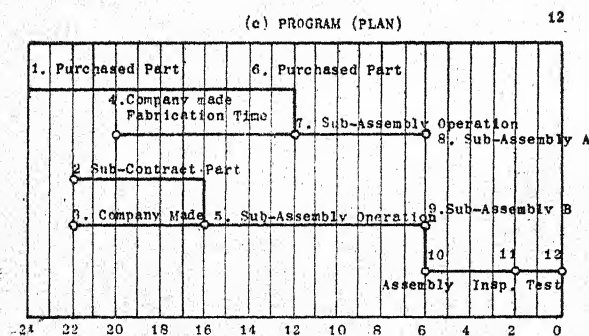
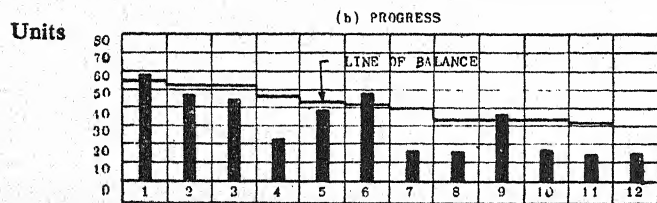
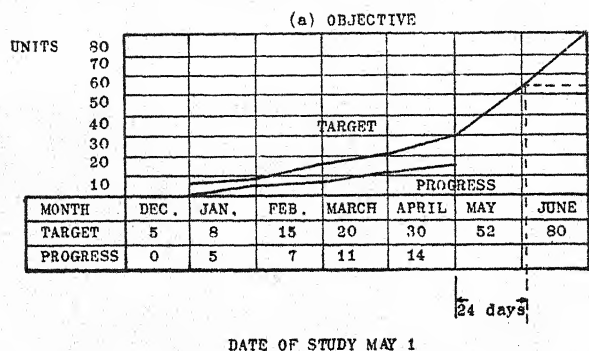


Fig. 3. Flow Chart for a Building Project.

Line of Balance Chart

The Line of Balance Chart used in monitoring production jobs, where quantity factor is involved, comprises a combination of the Process Chart and the Gantt Chart, where the tasks are plotted on a time scale according to their sequential and lead-time relationships leading to the final event, as shown in Fig. 4. A good deal of success is claimed to have been achieved by using this technique on production type programmes or repetitive operations. However, this technique has limited applications in non-repetitive operations such as construction projects or research and development projects, because this chart does not indicate the free time available (Slack) to different activities; nor does it distinguish critical areas of operation from the non-critical areas.



Working Days Prior to Shipment (Lead in Days) (22 Work Days per month)

Fig 4. Line of Balance Chart: Production Prototype.

Network Technique

Fig. 5. is a typical network diagram. It will be observed from this figure that the network technique shows the dependencies and inter-relationships among the various accomplishments. The network technique does not possess the disadvantages and deficiencies men-

tioned in the four conventional methods described above, as will be evident from the paragraphs that follow.

Application of the Network Technique

Since its introduction in 1957/1958, the network technique has been widely used in U.S.A., Canada, Great Britain, etc. and is reported to have been introduced in Russia in 1963.

There is no inherent limitation on the size or complexity of the job to which the network technique can be applied. It can be applied to a complete job in its entirety, or to part of the job, and to a wide variety of operations. No matter what the size, the type of job best suited to the application of this technique is one which has a single objective and is undertaken only once, that is, involving non-repetitive processes. It is especially useful in planning, scheduling and control of construction projects, research and development, overhaul and maintenance programmes, weapons system development, new product development, etc. The technique can be introduced in any phase of a job. However, its full potential is realised best when the technique is used from the initial stages of inception and through the life of the project.

It may be worth mentioning here that the network approach has been utilised in areas such as the following :

1. Construction activities.
2. Overhaul and maintenance planning.
3. Research and Development (Weapons and Space system programmes).
4. Introduction of new products.
5. Civil defence programmes.
6. Atomic energy programmes.
7. Preparation of manuals and reports.
8. Salvage operations.
9. Military operations.
10. Financial forecasting process.
11. Administrative planning.
12. Training programmes.
13. Mining operations.
14. Distribution planning and marketing programmes.
15. Installation of new computer.
16. Land development programmes.
17. Documentation control.
18. Staffing of plants.

19. Advertising programmes.
20. Issue of securities.
21. A play, from casting through opening night.

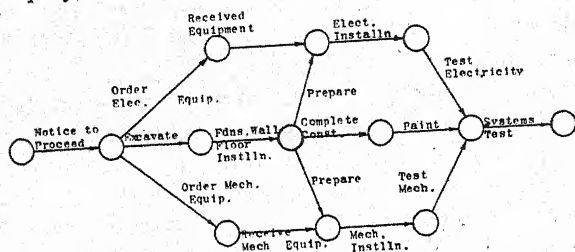


Fig. 5. Network Diagram

Another interesting network application is what may be called 'pre-crisis' planning. This relates to the programmes of action that an organisation could implement when floods occur in Assam State, or when a hurricane hits the Kerala coast, or what the Indian Airlines Corp'n. could do when a strike occurs, etc. The answers to such problems could be sought by means of programme of action and its schedule developed, in a systematic fashion, by the network technique and its analysis, ready to be commissioned should any such crisis occur all of a sudden.

The network technique is not considered suitable for scheduling production control jobs where the processes involved are of a repetitive or routine nature.

Developing a Network

The initial step in the network technique is the development of the network itself. Before describing the method of developing a network, the basic concepts and terms involved in the technique are explained below.

Definition of Network

A network is a graphic plan of all activities and events that must be completed to reach the end objective of a programme or project, showing the planned sequence of their accomplishments, their dependencies and inter-relationships.

The basic components of a network are :

- Events, and
- Activities

These are illustrated in Fig. 6 and described below.

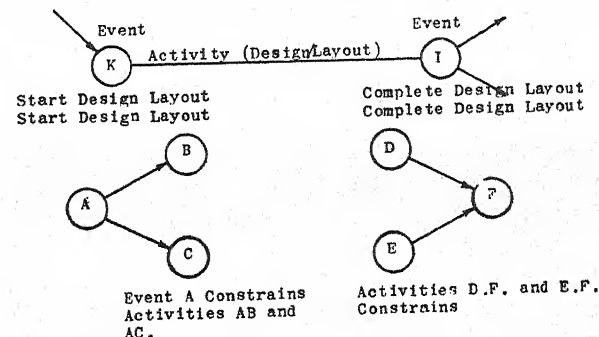


Fig. 6. Basic Components of a Network.

Event

An event is a specific accomplishment (physical or intellectual) in a programme or project plan.

The Event

- (i) is recognisable as a particular instant in time ; that is, a point in time and not a passage of time ;
- (ii) does not, therefore, consume time or resources ;
- (iii) is represented on the network by a geometrical figure such as circle, rectangle, square, etc ; and
- (iv) expresses a state of being such as :
 - Contract awarded
 - Project approved
 - Foreign exchange sanctioned
 - System tested.

Activity

An activity represents a job or project element to be completed, lying between any two events, these events being the preceding and the succeeding events.

The Activity

- (i) usually consumes time and resources ;
- (ii) is represented on a network by an arrow, the direction of the arrow indicating the sequence in which the events are to occur.
 - ✓ The length of the arrow need not be drawn to scale.
- (iii) must be independent ; that is each arrow is used to represent exactly one, and only one, operation or segment of an overall programme. However, a number of arrows may be used to

represent different parts of the same operation, as will be illustrated lower down.

- (iv) indicates work such as :
- preparation of designs
 - scrutiny of tenders
 - laying pipes
 - equipment erection
 - testing
 - procuring, etc.

Before developing a network as in Fig. 7, all individual tasks to complete a given programme or job should be visualised in such clear enough manner as to be shown on the network. While developing a network, one should pose and answer the following three fundamental questions in respect of each arrow, in the network, representing an activity ;

- (i) What activities should precede the one being drawn, that is, before this activity can be started ?
- (ii) What activities can immediately follow this activity ?
- (iii) What activities can proceed concurrently ?

The illustration given in Fig. 7, considers a man getting up in the morning, washing, shaving and dressing; cooking of fish and chips; making of tea and toast; and finally the man sitting down for breakfast. This illustration shows clearly the interdependence of the various activities and their sequence. For example, shaving is carried out after washing and drying face, but not until boiling water is available.

The development of the network is best initiated by a team of personnel familiar with the objectives and requirements of the programme or project and experienced in the functional areas.

Ground Rules for Network Development

There are certain ground rules to be observed in developing a network. These are :

- (i) No event can occur until every activity preceding it has been completed.
- (ii) An activity succeeding an event cannot be started until that event has occurred.
- (iii) An event cannot occur twice; that is, a path of activities cannot form a loop that returns to any event previously accomplished. Thus, no event can depend for its completion upon the completion of a succeeding event.

- (iv) Each activity must terminate in an event.
- (v) Time flows from left to right.
- (vi) Every activity on the network should be completed to reach the end objective.

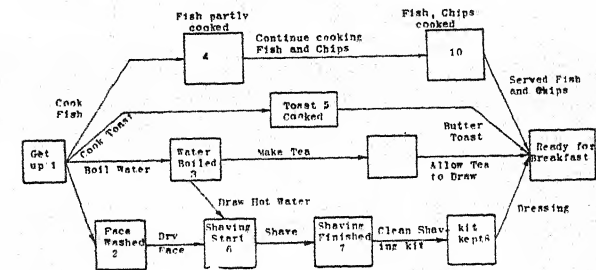


Fig. 7 Network of a Morning's Activities.

Detailing the Network

Each event in a network may be assigned a number. Numbering of events in a network facilitates describing the activities by the event numbers between which they lie. It is preferable to carry out the event numbering on a sequential basis. The head of an arrow should always bear a number higher than the one assigned at the tail of the arrow. Representation of an activity in numeric form has many advantages, the principal ones being :

- Identification of activity is immediate.
- Looking at the network diagram, it is easier to pick out numbers than words.
- Reference is abbreviated.
- Sequence is immediately evident.
- Reference to sequential jobs is easier.

The activities should be defined as sufficiently detailed and as precisely as possible. Activity description serves the following purposes :

- To identify the responsibility for performance of the activity.
- To determine the allocation of resources.
- To estimate the activity elapsed time (which will be explained below).

Dummy or Zero-time Activity

Certain activity arrows are sometimes used to simply represent a connection or inter-dependency between events. Such activities are

known as Dummies or Zero-time activities, as shown in Fig. 8. Dummy activities do not consume either time or resources. Dummies are as important as the zero in arithmetic. Dummies serve the following purposes :

- (i) To maintain the uniqueness in the numbering system, as every activity may have a distinct set of events (numbered) by which the activity can be identified. This is applicable only when a computer is used for network analysis and calculations.
- (ii) To maintain the logic in the network diagram.
- (iii) To show the relationship between events ; that is, when an activity has to be completed before another can be started.

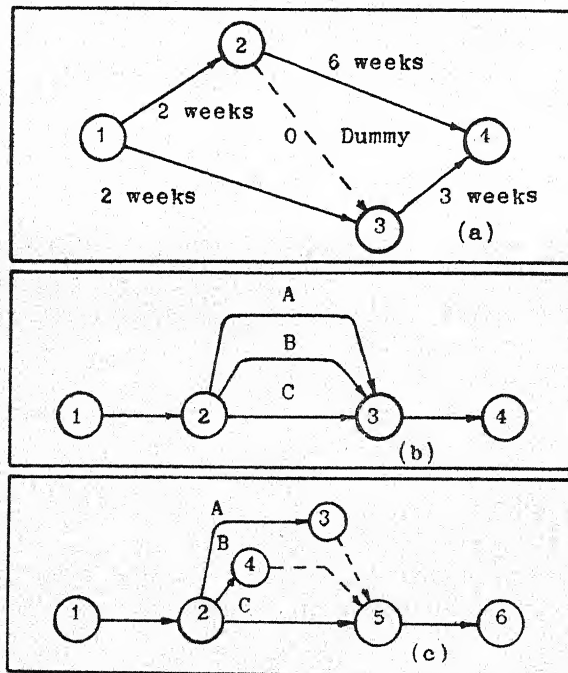


Fig. 8. Dummy Activities.

Illustration of Network in a Continuous Construction Work

Sometimes in order to show the flow of work concurrently, it is necessary to break up some of the activity arrows into two or more components. Consider a programme of pipe laying operation, illustrated in Fig. 9. The flow of work will be trenching, followed by pipe laying, followed by welding and then followed by back filling.

However, in an operation of this nature, it is not necessary for one job to be completely finished before the following job can start. For example, as soon as an appreciable amount of trenching has been completed, pipe laying can begin.

In more or less similar fashion, all four activities, namely, trenching, pipe laying, welding and back filling may proceed concurrently as shown in Fig. 9. In cases of this nature, activity arrows are needed to depict each activity—first a 'start' arrow, and then followed by a 'finish' arrow.

Concurrent activities can be performed independently of one another. However, 'concurrent' does not necessarily mean 'simultaneous'. The advantage of concurrent activities is that they can proceed simultaneously, if desired.

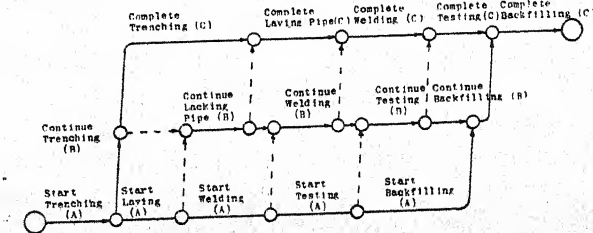


Fig. 9. Continuous Construction.

Time Estimates

After developing the logic of the network on the lines described in the foregoing paragraphs, the next step is to estimate the total programme or project duration and establish the project schedule. For this purpose, an estimate of the time required to complete each activity on the network is obtained.

Activity Elapsed Time

The time required for the performance of an activity assuming application of normally available and expected resources as planned such as manpower, materials, capital, etc. is termed the Activity Elapsed Time.

The activity time estimates are very important as they constitute the basis for the subsequent analysis that will be carried out on the network, and the accuracy of the programme or project schedule is very much dependent on this basic data from which it is established. As indicated earlier, such time estimation could be carried out only when the activity is sufficiently well-defined. Also, these estimates should be determined by the persons most familiar with, or actually

responsible for, the performance of the activity, and/or who have an intimate knowledge of the processes involved in the completion of the activity.

The activity elapsed time is symbolised by the expression ' t_e '. The elapsed time is expressed in convenient units such as hours, days, weeks, months, etc. depending on the size and nature of the programme or project. It is recorded below the activity arrow.

Time Uncertainty

Tasks such as Research and Development, which have not been previously attempted, have an inherent element of uncertainty in regard to the time required for their accomplishment. There is no historic data or prior experience in respect of the time required for the performance of such unfamiliar or uncommon activities. Moreover, the relatively large element of uncertainty for such activity time estimates would result in a good deal of uncertainty in the estimation of the duration of the project as a whole.

Three Time Estimates

To deal with this uncertainty factor, a statistical method has been used in the network technique. When it is difficult to estimate precisely the elapsed time for an activity, its likelihood of achievement is expressed in three time estimates rather than a positive assurance. The three time estimates are :

- Most likely time—symbolised by ' m '
- Optimistic time—symbolised by ' a '
- Pessimistic time—symbolised by ' b '

These time estimates are described below.

Most Likely Time

The most likely time is the estimate of the normal time an activity would take ; that is, the time which would occur most often if the same activity were repeated independently a number of times under similar circumstances or conditions.

Optimistic Time

The optimistic time is the shortest possible or minimum time in which the activity can be completed, assuming everything goes well. This time is considered to be attained normally once or twice in hundred times of the performance of the activity.

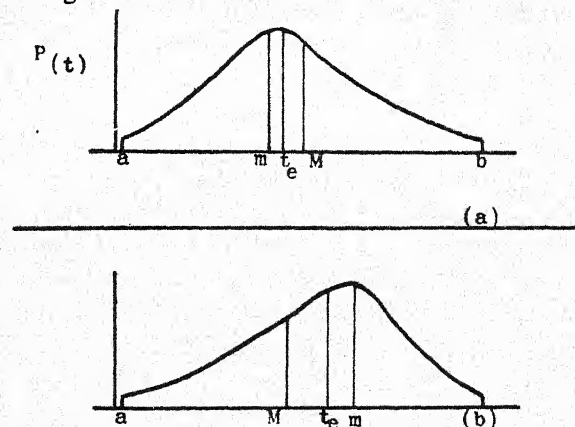
Pessimistic Time

This is the longest or maximum time an activity would take if everything goes wrong, barring acts of God (such as floods 'fire, strike, etc.)

and very rarely it could exceed this time. This estimate is also considered to occur once or twice in hundred times of the performance of the activity.

Beta Distribution Curve (Probability Theory)

The most likely time need not necessarily occur midway between the optimistic and the pessimistic times nor on the extremes. On the other hand, the chances of the actual time occurring on or near the most likely time are high. Therefore, the probability of its occurrence may vary over a range of time estimates for the activity. If this variation is plotted graphically, it will give a time distribution curve as in Fig. 10. It is clear that the most likely time (m) would occur most frequently and the most optimistic time (a) and the pessimistic time (b) least often. Mathematical techniques are used to determine the shape of the distribution curve. The basis is that the shape of the curve is Beta distribution with a range equal to the time between the optimistic (a) and pessimistic (b) estimates, its peak being situated at the most likely time (m) and having a standard deviation of one sixth of the range ($b-a$). The choice of Beta distribution is due to the fact that it fits the situation which is normally encountered on the average network.



LEGEND

a = Optimistic time
 m = Most likely time
 b = Pessimistic time
 t_e = Expected time

M = mid-range
 $\frac{(a+b)}{2}$

(t) = Probability

Fig. 10. Beta Distribution Curve.

Activity Expected Time

The three time estimates are converted to a single expected elapsed time for the activity, which is calculated from a statistically-derived formula :

$$t_e = \frac{a + 4m + b}{6}$$

The expected single time estimate divides the area under the probability distribution curve into two equal parts. Hence it is the time which has a fifty per cent chance of its being exceeded by, or being greater than, the actual time.

It needs to be emphasised that the three time estimates are not the most desirable because :

- such estimates need a great deal of extra calculations calling for computer use; and
- estimating of 'a', 'm' and 'b' (particularly 'b') is unreliable.

Normally, single time estimates would be used.

Standard Deviation

The Standard Deviation (S.D.) of the actual activity completion time shown by the distribution curve in Fig. 10 is calculated from the formula :

$$S.D. = \frac{b-a}{6}$$

The standard deviation is required for the subsequent calculation of the probability of achieving the specified schedule date for the completion of a project. The standard deviation which represents a measure of the dispersion or the spread of the curve is an expression of the variation between the optimistic (a) and pessimistic (b) time estimates, indicating the range in which actual time would most often fall.

Earliest Expected Event Time

After determining the elapsed time (t_e) for each activity, the next step (or requirement) is the calculation of the Earliest Expected Time for each event, symbolised by the expression, T_E

The Earliest Expected Event Time is the earliest time when an event may be expected to occur, and T_E for an event is calculated from the beginning event by accumulating or summing up the activity times through the longest path on the network. When two or more activities constrain a single event, T_E is calculated along each path and the longest time is chosen as the T_E of the given event. This is based

on the principle that an event can occur only after all the activities preceding it are completed. T_E is written in a square box above the event, as shown in Fig. 11.

T_E for the end event determines the total project duration, i. e. the time required to complete the whole project.

Latest Allowable Event Time

The next step consists in the determination of the Latest Allowable Event Time (T_L) which is the latest time when an event can occur without creating any expected delay in the completion of the total job i. e. the end event. The T_L for the end event is set as equal to the T_E of the end event. or equal to any pre-determined, specified, or directed time. The T_L for any given event 'x' is then calculated backwards from the end event as follows:

- (i) Subtract from T_L of each immediately following event, the t_e leading to that event from event 'x'.
- (ii) Then, select the smallest number (in case there are more than one following event) thus obtained. This becomes the T_L for event 'x'. This value also represents the longest backward time path from the end event.

The T_L values thus calculated are shown in small circles placed below the events as in Fig. 11. The T_L for the start event of the network would then indicate the latest time by which the job can be started without causing the end event to slip beyond the pre-determined target time.

Slack

After both the Earliest Expected (T_E) and Latest Allowable (T_L) Time values have been calculated for each of the events, Slack can be determined in respect of each event in the network. Slack is the amount of time an event can be delayed beyond its T_E without affecting the T_L of the final event. Event Slack is equal to difference between the Latest Allowable Time and the Earliest Expected Time; that is, $Slack = T_L - T_E$. Slack for each event is shown in Fig. 11. For any event, Slack may be zero, positive, or negative.

Zero Slack (i.e. T_L equals T_E) means that exactly enough time has been allowed for the job and there is no spare time. This indicates that the job would be on time.

Positive Slack (i.e. T_L is greater than T_E) is 'time to spare', and means that there is more than enough time required to complete the job. If Slack for the network end event, is positive, that is, when the directed time or date is later than the calculated T_E for the end

event, the job will be ahead of schedule. A relatively large positive Slack will indicate a network path which will allow its share of resources in men, money, materials etc. to be reduced without causing any delay in the completion time of the job as a whole. Management can then authorise the transfer of resources from such a path to another path requiring resources. Such transfer of resources results in shortening of the total duration time for the overall job. This is further discussed later.

CALCULATION OF T_E AND T_L

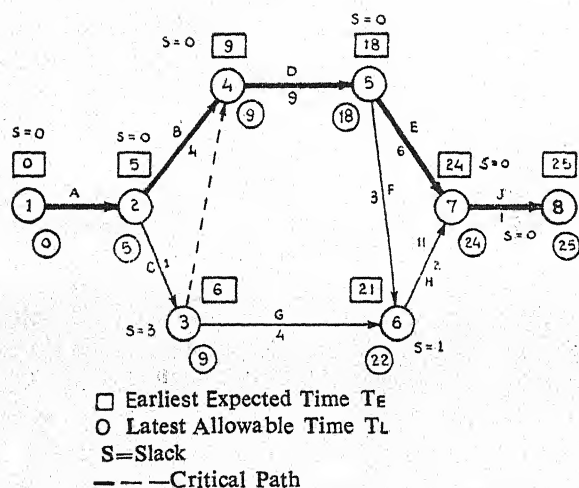


Fig. 11.

Negative Slack (i.e. T_L is less than T_E) means that enough time has not been allowed for accomplishment of an event and indicates 'apparent trouble'. Where negative slack occurs, management's attention should be focussed on these areas, most warranting their action to reduce the time required to complete the job. Negative Slack will be discussed in some detail later.

Identification of the Critical Path

A network which has been completed with the time duration entered for each activity becomes a preliminary work sheet for establishing a time schedule for the whole programme or project. By adding the time durations along the various paths through the network, from the beginning event to the end event, it will be found that there is one limiting path which takes the longest time through the network. This is called the Critical Path, shown in heavy line in

Fig. 11, i.e. network path 1-2-4-5-7-8. The Critical Path has the least algebraic slack and it determines the minimum or earliest time required for completion of the overall project, as the sequence of activities on this path imposes the most rigorous time constraint on attainment of the end event. If any time is to be saved on the overall project, it should be saved on the activities which fall on the Critical Path.

Since all the network paths, other than the Critical Path, are shorter, they have some amount of Slack or free time. The identification of the Critical Path from the Slack or non-critical paths, would indicate possibilities of diverting resources from activities on non-critical paths, (which have some Slack) to activities on the Critical Path, thereby leading to reduction in the total project duration. In this fashion, the project can be brought within a desired time of completion by the application of a given measure of resources. This aspect will be further dealt with later. Indiscriminate expediting, which may be purposeless and expensive, can thus be avoided, and selective use of the available resources on really worthwhile tasks can be ensured. Knowledge of the Critical Path at the outset of the project permits management accurately to predict the completion time of the project. It also permits management to focus attention on the more important items of work in the total project.

If any activity along the Critical Path is delayed, all others following, as well as the entire project will be correspondingly delayed. This is the basis for the important predictive feature of the network technique and represents its unique contribution to the principle of management by exception. By insulating the Critical Path, it is possible to determine when an activity on the non-critical paths may start without any effect upon the completion time of the project. If management has to control the timing of the project, it should be aware of the Critical Path at all times, so that bottlenecks and possible delays could be foreseen or anticipated and the management could take corrective action before they become a reality.

There can be instances when there are more than one Critical Path in any given network, i.e. paths with least algebraic slack values that are the same or very close to each other.

Activity Times

We have seen that there is an earliest and a latest time by which

each event in a network can occur. These are not necessarily the times at which individual activities leading to or emanating from, an event can start or finish ; but from the earliest and latest event times, the following activity times can be calculated :

(i) Earliest Activity Start Time (E.S.)

This is the earliest time at which an activity can begin.

(ii) Earliest Activity Finish Time (E.F.)

This is the earliest time when an activity must finish.

(iii) Latest Activity Start Time (L.S.)

The Latest Time by which an activity can begin is called the Latest Start.

(iv) Latest Activity Finish Time (L.F.)

This is the latest time when an activity must finish.

These times establish the limits within which we can choose the optimum activity start and finish times.

Objectives

The objectives in calculating the activity times are :

- (i) To draw up a complete, detailed time table or schedule ; and
- (ii) To evaluate and optimise the use of resources on various efforts.

For detailed implementation and control of a project, it is necessary to decide the optimum times or dates on which individual activities should start and finish.

Calculation of Activity Times

The four activity times are dependent upon the T_E and T_L values of the preceding and succeeding events of an activity and the activity duration, t_a . The rules for calculating the four activity times are :

- Earliest Start (E.S.) = T_E of the preceding event.
- Earliest Finish (E.F.) = E.S. + activity duration (t_a).
- Latest Start (L.S.) = T_L of the succeeding event — t_a .
- Latest Finish (L.F.) = T_L of the succeeding event.

Consider the network diagram in Fig. 11. In respect of Activity G (3-6), the earliest expected time for its preceding event (event 3) is 6 days after event 1. This is the earliest activity G can start. Adding its time duration (4) to this figure (6), it is found that the earliest it can finish is 10 days after event 1.

From the latest time for its succeeding event (event 6), it is found

that the latest this activity can finish is 22 days after event 1. Subtracting the activity duration (4) from this figure (22), it is seen that the latest it can start is 18 days after event 1.

Activity Slack

The next step is the calculation of the Activity Slack. As indicated earlier, Slack is the difference between the time allowed and the time required. The Slack associated with a given activity (i. e. Activity Slack) is equal to the difference between the maximum time available to do the activity and the time required for the performance of the activity or activity duration (t_a). The Activity Slack is determined as follows :

$$\text{Activity Slack} = \text{L.F.} - \text{E.S.} - t_a$$

$$\text{or} = \text{L.F.} - \text{E.F.}$$

$$\text{or} = \text{L.S.} - \text{E.S.}$$

If there is any excess in available time to perform the activity, then there will be a variation in starting time, since we can delay the start of the activity to the full extent of the excess available time. The excess time or Activity Slack will, in turn, show up the difference of possible finishing times of the activity.

Let us consider activity G in Fig. 11. From the earliest and latest event times (that is, for events 3 and 6) it is observed that activity G can start as early as 6 days after event 1 and can end as late as 22 days after event 1. This means that the time available to perform activity G is 22—6 or 16 days. As the duration or time required to perform this activity is only 4 days, there is 16—4 or 12 days spare time or Slack. There is thus considerable latitude as regards timing, because we can start this activity any time management desire in the 12 days spare time available between 6th and 18th day, so that the activity is completed by the 22nd day after event 1. The spare time or Slack can accordingly be regulated.

Coming to activity H, it requires 2 days to complete, but has 24 minus 21 or 3 days available in which to perform it. The 1 day's Slack can be arranged to fall before or after the 2-day job.

Activity Times as well as Slack for all the activities on the network in Fig. 11 can be worked out on the lines explained above and shown in a table as follows :

- (iv) By addition of more resources to critical activities;
- (v) By reducing the scope of activities and/or changing or lowering performance requirements of certain activities; and
- (vi) By eliminating, as a last resort, low-priority activities, if feasible.

These steps are briefly discussed below :

Once the Critical Path on the network has been identified, it is necessary first to re-examine closely the activity duration estimates t_e along the Critical Path in greater detail with a view to determining whether the completion time derived from the network analysis could be brought back to meet the directed date.

Greater paralleling of activities may be possible by breaking down the project into further small definable units, and introducing more concurrent performance. This step may involve a risk 'trade-off' which has to be evaluated by management. It is possible that because of such paralleling of efforts, another or second Critical Path may be added to the network. This too should be examined in the same manner.

As regards re-allocating or increasing the resources applied to critical activities, these include capital, manpower, equipment or space. Overtime work is also a resource that may be applied to these activities. An acceptable method of obtaining additional resources for activities on the Critical Path will be to re-allocate or transfer some resources from non-critical paths having positive Slack and which can afford to lose some resources. This procedure may increase the time required for those non-critical paths, but as long as such increase does not closely approximate the time value for the Critical Path, the procedure is permissible.

When diversion of resources from non-critical activities to reduce the time of some of the activities on the Critical Path is no longer possible, additional resources will have to be mobilised to work on Critical Path activities. The cost of additional resources has, however, to be weighed against the savings to the project in an earlier completion date, as well as the corresponding financial returns and other benefits from the investment on the project.

The method of changing the performance requirements, and of decreasing the scope of work by lower specifications for various Critical Path activities may be adopted, if this is feasible. Sometimes the

specifications for quality assurance applied to certain activities may be unnecessarily high. Scaling down such specification to lesser, but still acceptable, values leads to reduction in the scope and the time of performance of the activity.

As regards the elimination of low priority activities, though this is not generally easy, this approach may have to be adopted when time is of paramount importance.

Advantages of the Network Technique

It is worth emphasising in conclusion, that the network technique has several distinguishing characteristics. The application of the network technique to the planning and scheduling of a programme of project would:

- (i) force logical thinking of the project plan from the beginning to the end;
- (ii) enable the determination of the project duration more accurately than by other planning and scheduling methods available;
- (iii) identify the activities in the project, critical to completion of the project on schedule-which require greater management attention;
- (iv) provide a vehicle by which project schedules can be shortened;
- (v) measure the effects of schedule slippage on project duration;
- (vi) provide a means of scheduling resources efficiently;
- (vii) identify dependencies between participants including contractors, leading to proper co-ordination of efforts and identification of responsibility;
- (viii) introduce an easily understood and common language of planning to all levels of the staff and serve as an effective medium of communication; and
- (ix) provide the management with a tool for more definite reporting and effective control of the project.

PART B

EXPERIENCES IN PERFORMANCE BUDGETING

7

PERFORMANCE BUDGETING: AMERICAN EXPERIENCE

M.J.K. Thavaraj

HISTORICALLY, the movement towards performance budgeting was somewhat haphazard and did not develop all the necessary elements. But the essential aspects were understood by a few progressive cities in the United States several years before the constitution of the Hoover Commission. Since departmentalisation at the city level is generally on a functional basis and appropriation is usually made for departments, the elementary aspects of performance budgeting have existed in city budgets for half a century or more. But the development of city budgets is mainly due to the outstanding efforts of professional organisations such as the Municipal Finance Officers Association and the International City Managers Association in the establishment of departmental work programme and in the preparation of helpful documents and manuals. Richmond and New York City deserve special mention as the pioneers in this direction. Later on several progressive local governments such as the city and county of Denver (Colorado), Oxford (California), Kissimmee (Florida), San Diego (California), Kansas City (Missouri), Detroit (Michigan), Rochester (New York), Los Angeles and Berkeley (California), Slater and Lebanon (Missouri), Wichita (Kansas), and Phoenix (Arizona) were also blazing their own trails. These city governments may be credited with the experimen-

tation of several patterns of budgeting according to their particular circumstances.

Initially, their experiments in performance budgeting were largely confined to annual operating expenses. But the progressive municipalities began to realise the futility of their earlier practices to deal with the problems of orderly development of capital facilities and urban renewals which had assumed enormous proportions on account of the rapid growth of suburbs. Consequently there arose a growing realisation of the need for an organic integration of planning, programming and budgeting which would help an orderly implementation of programmes in terms of needs and financial potentialities; development of programme consciousness at all levels, introduction of objectivity in the ordering of projects; rationalisation of rates and tax structures as well as better phasing and scheduling of projects.

More complex in function than the city but less complex than the Federal Government is the state jurisdiction. Though the State Governments, in general, were lagging behind the cities in budget improvements, the progressive among them tended towards Performance Budgeting. Oklahoma has done significant work in developing a functional budget. California is outstanding for the progress made in erecting an appropriation structure in terms of programmes, and Maryland voted to adopt a performance budget system in November 1952. Other states are also converting to programme budgeting in some degree. The New York State has adopted performance programme type of budgets in selected departments since 1954.

As for the Federal Government, the Taft Commission in its Report of 1912 recommended the development of budgets in accordance with the subjects of work to be done. Many of the individual agencies and departments of the Federal Government have justified their activities before the Congressional Committee on a programme basis for years. For instance the U.S. Department of Agriculture attempted 'Project Budgeting' in 1934. The Tennessee Valley Authority developed a programme budget in terms of the various programme categories representing the specified objectives or implications of the general responsibilities charged to TVA Act. During the Second World War, several Federal Agencies began to develop activity schedule within the framework of programme budgets. The Government Corporation Control Act of 1945 required that the public corporations should follow the pattern of budgetary exhibits established for

business-type agencies. The U.S. Navy began to prepare its budgets both on object and programme basis since 1946. With the passage of the National Security Act (Amendment) of 1949 the Congress of the United States made mandatory the presentations of performance budgets by the Departments of Defence and the military establishments (in the Department of the Army, the Department of the Navy and the Department of the Air Force). They have made rapid strides in recent years. The works of F.C. Mosher and Hitch and McKean reveal the extensive and intensive use of performance budgeting in the most delicate areas of national security.

The Hoover Commission of 1949 was primarily concerned with the problems of allocation by an agency of its resources and the efficient and economic execution of its programmes of work. The task-force headed by A.E. Buck prescribed performance budget as the key to the solution of these problems. The Budgeting and Accounting Procedures Act of 1950 which was meant to embody the main recommendations of the Hoover Commission did not even use the term 'Performance Budget'. Nevertheless it provided that "Budget shall set forth in such form and detail as the President may determine — (a) functions, activities and projects of the Government; (b) any other desirable classifications of data; (c) a reconciliation of the summary of expenditures with proposed appropriations." These provisions might be interpreted to have provided a basis for performance budgeting.

The implementation of this technique, however, ran into a few difficulties. Two of these are enumerated: (1) the necessity of treatment of separate programmes even when there was no clear cut responsibility, and (2) the inadequacy of cost information on many of the programmes shown in the Budget. The Second Hoover Commission Report of 1955 paid attention to these and related problems. After its deliberations the Commission recommended that efforts should be made to streamline the classification of programme and activities. It also encouraged the development of cost-based budgets. In pursuance of these recommendations, the Bureau of the Budget was reorganised to meet the new tasks and the coverage of the technique was also widened to include almost all the activities of the Federal Government. Today, about 95 per cent of the Federal budget is based on functional classification at all the stages of the budgetary process. Almost the entire work of the Federal Government is expressed in terms of 12 basic functions which are further sub-divided into a total of 60 sub-functions, 500 appropriation units and 5000

programmes. Each programme embraces a number of projects or activities. However, the same degree of success is not claimed either in designing suitable measures of work or in introducing accrual accounting. Hardly 50 per cent of the Federal sphere is credited with a reliable work-load data. Even accrual accounting is restricted to less than three-fourths of the Federal activities. At the same time the Budget Methods Division of the Bureau of the Budget is making strenuous efforts to step up the spread of performance budgeting in the remaining areas.

In the meanwhile several developing countries of Asia, Africa and Latin America have begun to realise the importance of the adoption of performance budgeting as a necessary adjunct to planned economic development. The Philippines, Taiwan, South Vietnam are some of the Asian countries which seem to have profited by performance budgeting. Convinced of its utility as an efficient tool of implementing its long-term plans and programmes as well as their efficient management, the United Nations and their subordinate agencies have prepared some useful documents and manuals on budgetary reforms, classifications of government accounts as well as on performance budgeting. The various workshops organised in Bangkok, Addis Ababa and Copenhagen have evolved some broad principles on the basis of which developing countries could reorganise their budgeting systems. The Thirteenth International Congress of Administrative Sciences held in Paris during 20-23rd July 1965 had also devoted considerable attention to new techniques of budget preparations and management. The fifteenth International Congress of Administrative Sciences held in Rome during 6 to 11 Sept. 71, gave considerable importance to the evaluation of experiences in the modernisation of budgeting especially in the direction of PPBS & Performance Budgeting.

8

THE CASE FOR PERFORMANCE BUDGETING IN INDIA

M.J.K. Thavaraj

INDIA has had a long tradition of public investment. One of the outstanding characteristics of the traditional Indian polity was the provision of public works such as roads and irrigation. In the early years of its rule, the East India Company made a drastic departure from this tradition. But soon the wiser amongst the British administrators in India realised the importance of a good network of transport and communication primarily to promote the commercial and political interests of England. Irrigation was also given special attention to insure agriculture against the uncertain monsoon. As a result, gross public investment constituted nearly as much as five per cent of the national income during the first decade of the present century. Wars and economic fluctuations of the subsequent decades arrested this trend so that on the eve of the First Five Year Plan, the State owned no more than 3 per cent of the entire reproducible, tangible wealth of the nation. Even this was confined mainly to economic overheads. Industry, agriculture and trade were almost entirely private.

Planning involved substantial step-up of public investments. The rate of public investment quadrupled over the first decade of planning in India. By the end of the Second Plan period, the public sector claimed nearly half of the total annual investment in the economy. Consequently, the share of the public sector in the repro-

ducible, tangible wealth of the nation had increased to about 25 per cent of the total by 1960-61. By projecting this trend the Planning Division of the Planning Commission hopes to raise this ratio to more than one-half of the total by 1975-76. But though the volume of public investment has increased considerably over the plan period, infrastructural investment in railways, roads, irrigation etc. account for more than three-fourths of the entire investment.

Nevertheless, it should be noted that public sector has pioneered into the industrial sector in a big way in recent years. The first decade of planning in India witnessed an outlay of about Rs. 2100 crores, of investment in the industrial field. Of this, nearly Rs. 1200 crores was in the public sector. The Third Plan envisaged an investment outlay with nearly 60 per cent in the public sector. The predominance of the public sector in industrial investment is likely to be maintained through the Fourth and the later Five Year Plans.

The bulk of public investment in industries was in the intermediate goods sector such as metal, fuel, chemicals, machinery and equipment, power etc., which involve large volume of investment, highly specialised skills, long gestation period and considerable risk and uncertainty. The planning, programming, construction and operation of these industries demanded the application of sophisticated methods and techniques of management involving new organisational structures, relationships, processes and behavioural patterns which the traditional administrative system could not easily provide. The colonial administration it must be admitted, was quite capable of handling new development in industry, trade and commerce, requiring some understanding of modern management. For instance, the Indian Railways, one of the largest public undertaking today, has always been run on commercial lines. Some major irrigation works such as the canal network in the Punjab, as well as the irrigation schemes on the Cauvery and Krishna in the South were very well-conceived, designed and executed. Even state trading and controlled distribution of essential supplies were handled efficiently in some of the leading states during the Second World War. But all these would pale into insignificance before the scale and range of operations of public undertakings in the Plan period. Hence the administration has been fuambling under the weight of unprecedented levels of developmental responsibilities. In particular, the outmoded budgetary system and the rules and procedures governing financial administration became a major bottleneck to development administration.

Colonial administration was highly centralised with the Secretary of State as the fountain of authority. The Finance Department was the chief custodian of Indian finances exercising strong centralised financial control to ensure accountability for appropriated funds. It is true that the process of spatial decentralisation/initiated by Lord Mayo gradually gathered momentum culminating in the inauguration of provincial autonomy accompanied by some diminution of the powers of the provincial Finance Departments which had to readjust their roles within the framework of popular governments. The Governor-General-in-Council had also to redelegate some of the powers conferred on him by the Secretary-of-State. Nevertheless, the Finance Departments were objects of stringent criticism for their wooden attitudes and capacity for straining at the gnat while swallowing the camel. In particular, reports submitted by A. D. Gorwala and Dean Apple by emphasised the need for delegation of adequate financial powers to the administrative ministries. These recommendations have strengthened the process of conferring enhanced delegation of financial powers on the spending ministries. The delegation plans of August 1958, September 1961 and June 1962 are important milestones in the direction of more rational exercise of financial control. Increasing doses of autonomy have also been conferred on public enterprises. In some places officer-oriented administration and single file system have been introduced in order to speed up the decision-making process. Financial advisers are also attached to the administering ministries to improve budget formulation and to enable them to exercise the delegated financial powers thereby avoiding the delay involved in frequent references to the Ministry of Finance.

The Ministry of Finance has also been a force for economy and efficiency in the Government, looking for possibilities of management improvement in the administrative ministries. The Department of Expenditure could undertake work studies and management analyses in specified problem areas through specially designed units such as the former Special Reorganisation Unit and the present Staff Inspection Unit.

New items are required to be justified in detail. In recent years, advance programming of operations on a long-term basis with annual breakdown has also been taken up. Apart from laying out the operational tasks such as the targets and other aspects, detailed schematic budgets are also being drawn up in respect of important schemes. After

intensive review in the Department of Expenditure and in other Central review organisations, the capital budget items (except civil works) are formulated for review by the Planning Commission. After consultations between these organisations and the Cabinet, decisions on the allocation of available resources are communicated to the ministries concerned which supply revised new item statements to the Planning Commission and the Department of Expenditure. Similarly, Civil works estimates are processed through the Department of Expenditure, Ministry of Finance and the Department of Works, Housing and Urban Development. After the Planning Commission indicates the amounts available for civil works, a Works Priority Board in the Department of Works, Housing and Urban Development determines, in consultation with the administrative ministries concerned, the order of priorities among the proposed civil works projects and distributes the available amounts accordingly. Finally, the Department of Works, Housing and Urban Development prepares the civil works demands for processing through the Department of Expenditure and inclusion in the Budget. Appeals can be made by individual ministries to the Cabinet. When financial determinations are made, rough data on all requirements are brought together for assembly by the Budget Division of the Finance Ministry into the annual budget presentation. It should, however, be noted that such detailed estimates are not available in the case of several governmental operations. For instance, in a recent year nearly half of the Rs. 32.30 crores provided for construction of National Highways under Demand No. 141, Major Head 103, was reserved for unforeseen works. Obviously, such provisions in the budget help neither rational examination of the estimates nor effective fiscal management. Once the estimates are subjected to the scrutiny of the Ministry of Finance the financial data are recast by the Accountants-General in the form of the Annual Financial Statement and the Demand for Grants.

The Annual Financial Statement covers all financial transactions of the Centre. Basically, it is an accounting presentation that shows data by major and subsidiary account heads prescribed by the Comptroller and Auditor General under the fund structure established by the Constitution. According to Article 30 of the Account Code (Volume I), the classification of transactions shall have closer reference to the department in which the revenue or expenditure occurs, than to the object of the revenue or expenditure, or the

grounds upon which they are sanctioned. Budget is composed of several Demands. Each Demand may embrace some major heads such as the following :

- 19-General Administration
- 27-Scientific Department
- 28-Education
- 29-Medical
- 30-Public Health
- 31-Agriculture
- 33-Animal Husbandry
- 34-Cooperation
- 35-Industries.

While the major heads are generally in conformity with the departmentwise classification of Demands in the Budget, they also embrace fields of activity, such as education, agriculture, public health, etc., which are functional categories. The major heads are sub-divided into minor and detailed heads. The minor heads too, are partly organisational and partly functional, for instance, under 31-Agriculture, the following are some of the minor heads: Director, Superintendence, Agricultural Education, Agricultural Engineering, Grants-in-aid, Contributions, Works, Other Charges, etc. Under the minor heads, the sub-heads or detailed heads conform by and large to what is commonly referred to as 'object classification' some standard heads being, 'pay of officers' 'pay of establishment' 'allowances and honoraria' 'contingencies etc'. Government's transactions are thus classified not in accordance with any one rigid principle of classification, but in accordance with a number of criteria which sometimes operate together and sometimes present alternatives. The picture is thus broadly one of departmental-cum-object classification, criss-crossed by numerous classifications on functional basis.

These accounting classifications were adjusted in a major reform in 1961 to permit improved analysis of government expenditure. As a result, they now provide a few broad functional categories like Social and Developmental Services and Transportation and Communications while at the same time showing some across broad groupings like Administrative Services, as well as Contributions and Miscellaneous Adjustments (which includes a large item covering all grants-in-aid to the state governments). Thus, the functional categories

are not mutually exclusive and the total expenditure in a given function is not found in any one place. Nor does the Indian government present a separate statement on the functional classification of expenditure like the one prepared on an economic basis since 1957-58.

The provisions for Plan and Non-Plan expenditure under a demand are grouped in one supporting schedule and objects of expenditure are shown in another schedule. The data also are grouped to classify separately the revenue and capital expenditures and whether they are charged or voted items. This presentation is supported by a combination of narrative and statistical information in the back of the volume which presents notes on variations in the individual demands (in support of the estimates), broad aspects of non-Plan expenditure and notes on important schemes.

The Annual Financial Statements and the Demands for Grants are supplemented by an Explanatory Memorandum which is a separate volume of narrative, financial and statistical data designed to clarify and support the budget. It provides an analysis of the overall budgetary position of the government and summaries of revenues and expenditures and capital budget transactions derived from the Annual Financial Statement. This presentation, therefore, is based on the official classification of financial accounts and shows net expenditures under the various heads of account. In addition, it furnishes a number of separate analyses of different aspects of the total budget covering such subjects as gross tax revenues and the costs of collection; resources transferred from the Centre to the States; expenditure on various functional categories and a distribution of the Demands for grants, including reconciliation with the gross basis of financial presentation in the Demands.

Other documents accompanying the annual budget include an Economic Survey which presents an analysis of production trends, prices, balance of payments, national income and related accounts, Annual Reports for each of the ministries and a consolidated report on all commercial and industrial undertakings which explain the structure and operations of the various organisations and include significant statistical and workload information and the Railway Budget, supported by a Review of the Performance of the Indian Railway. The Railway Budget follows the general form of the Budget for the Government of India, *i.e.* consisting of a financial

statement, a Demand for Grants and an Explanatory Memorandum. The document on reviews of railway performance is a comprehensive presentation that analyses the performance in traffic earnings against the background of general economic conditions. It also reviews the performance and expenditure in relation to plans and targets; but in general, the progress of financial performance and physical achievements are considered separately.

Thus, under the Indian system, presentation of the Five Year Plan is almost exclusively in terms of functional categories such as agriculture, animal husbandry, industry, transport and communication, social services etc. Even the budget documents such as the Annual Financial Statement and the Demands for Grants contain a fair sprinkling of functional categories. However, these functional categories are prescribed by different authorities and while they can be reconciled they are neither uniform nor mutually exclusive. It is difficult, therefore, to develop a functional schedule which groups all operations of the Indian government that are directed towards the accomplishment of a specific service. Further more, the Indian budget does not identify the programmes and activities or projects that contribute to each of the functions or services performed by government. Again some classifications of this nature, appear in various parts of the budget but not presented uniformly or as part of an overall scheme.

The same difficulties are encountered in relating Plan schemes and the budget estimates of the State Governments. Attempts have been made to accommodate the expenditure incurred by various governmental agencies on the Plan schemes and programmes within the existing structure of classification. Firstly, the distinction between Plan and non-Plan expenditure has been introduced in the classification of vouchers so that expenditure stands classified as Plan or non-Plan. This distinction is reflected in the Finance Accounts, published separately from the Appropriation Accounts, the latter being concerned mainly with showing expenditures against appropriations. The second way in which the structure of accounts accommodates Plan schemes is by the opening of detailed heads for recording expenditure on individual Plan schemes or groups of small schemes. Along with the budget estimates, a separate book is published by each State government giving the provisions made for Plan schemes under the various major heads in the year in question.

It might thus appear that an attempt is specifically made to relate the Plan and the Budget. The actual position is not a satisfactory one. In the first place, the Finance Accounts gives minor head-wise details so that the total Plan expenditure and non-Plan expenditure under each major heads and minor heads are known. From these figures we can have an idea of the Plan expenditure of each Department broadly grouped under minor heads but not the expenditure on individual Plan schemes. Moreover, the groupings of schemes in the Plan do not coincide with the major and minor heads in the accounts and a number of schemes forming a related group are often executed by different departmental agencies. As revealed by a recent study on the problem of 'Linking of Heads of Department and Budget and Account Heads' made by the Management and Administration Division of the Planning Commission, the "head" of the Development, Agricultural Production is scattered under 11 different major heads in Bihar and under 12 major heads in Kerala. Such examples could easily be multiplied. As a result, the total Plan expenditure booked under a major or a minor head cannot surely be regarded as expenditure on individual or a group of Plan schemes. Secondly, there is a surprising lack of uniformity in the manner in which information relating to the provisions for Plan schemes is presented by various State Governments. Some State Governments (e.g. Orissa, Mysore and Andhra Pradesh) give the information in statements arranged on the basis of budget or account heads (as provisions for various schemes under one head of development or even for one scheme are often made under a number of budget heads, statement of Plan provisions arranged in accordance with budget heads are not very helpful). A few State Government (e.g. Tamil Nadu and Jammu & Kashmir) arrange the figures entirely by heads of development and schemes, giving a reference by number to the various budget or account heads under which provisions stand recorded, without indicating the actual provisions under each head. Still other Governments (Kerala and Punjab) arrange the figures according to the heads of development and schemes and indicate against each, the provisions made under each major head. The Maharashtra Government gives the figures in accordance with Plan heads in the abstract and in accordance with major heads in the detailed statements, so that the correlation of the abstract and the detailed statements, is not very easy. The Gujarat Government

gives the information in accordance with budget heads, and adds a statement connecting the Plan schemes and the major heads of account. The West Bengal Government gives a good deal of information, but in such a large number of statements that the publication is not easy to consult. It would seem that the Planning Commission has not suggested to the State Governments the adoption of a common pattern for the presentation of information relating to Plan schemes as a supplement to their budget estimates. Such a lack of harmony in the presentation of information relating to Plan and budget categories renders it difficult to get an integrated view of the plan and programmes on the one hand and the projects and activities envisaged in the budget on the other. Undoubtedly the present system of classification of expenditure looks like a labyrinth which is beyond the comprehension of average legislators or other members of the public who are mainly interested in knowing what the government is doing, how much, when and at what cost. They are least concerned about the accounting ingenuity manifest in the present system.

As an independent agency maintaining accounts and conducting financial audits for the Central and State Governments, the Comptroller and Auditor General of India wields enormous influence in the financial management throughout India. It participates in the budget process and issues annual financial and audit reports. Reports on the Centre are transmitted to the President and through him to Parliament for follow up action. For the States, reports are routed through the Governors to the State legislatures.

One of the anomalies of the present system is the combination of audit and accounts in the same heads. The question of separation has been under debate for some time. So far such a separation has also been effected in a few departments like railways and defence as well as in several of the public enterprises. But, the extension of the process of separation to the entire government is delayed on the ground of economy. As mentioned earlier there is a common classification for the budget and the accounts with appropriate adjustments and subsidiary compilation to the accounting data with the appropriation structure, funds structure, as well as the plan categories. In addition, the administrative ministries maintain accounts on a cash basis in terms of the budget demands in an

attempt to control the use of funds. It is true that periodic progress reports in terms of physical attainments are also introduced in some progressive departments. But in their preoccupation with the process of budget preparation and expenditure control the physical data thrown up to the higher echelons of management do not properly serve the purposes of decision-making, review and control. Budgeting would serve as an effective tool of management only when functional classification is introduced at all the stages of financial administration. It may also be worthwhile to introduce accrual accounting wherever necessary.

2

MOVEMENT FOR PERFORMANCE BUDGETING IN INDIA

M.J.K. Thavaraj

IN India, the need for modernising the budgetary framework was keenly felt ever since we undertook planned economic development. However, the first demand for the introduction of performance budgeting was made in the Lok Sabha in 1954, during the course of a debate on the Finance Ministry's control over expenditure. This theme was taken up and was further strengthened by the Speaker of the Lok Sabha in the course of his address to the annual conference of the presiding officers. It found further strength from the recommendations of the Estimates Committee. The Committee, in the 20th Report on 'Budgetary Reform' (1958) suggested :

"Performance-cum-Programme System of Budgeting would be ideal for a proper appreciation of the schemes and outlays included in the budget, especially in the case of large scale developmental activities. Performance budgeting should be the goal which should be reached gradually and by progressive stages without any serious budgeting dislocation. It is to be hoped that the experiment towards Performance budgeting on a selective basis in order to supplement the traditional budget would be expedited and that the 1959-60

Budget contain concrete result of it at least in the case of selected ministries or projects."

While noting the suggestion of the Estimates Committee, the Government indicated that the possibility of its introduction was already under examination of the Finance Ministry and that the feasibility or otherwise of Performance budgeting, even on a limited scale depends upon the outcome of this examination. They felt that if the findings of the study were favourable, it might even be possible to make a beginning in the 1960-61 budget. In response to this reply the Estimates Committee in its 60th-61st Report (1959) urged that matter be expedited so that the 1960-61 budget be a Performance budget partly if not wholly.

Further, in their 73rd Report (1960) the Estimates Committee reminded the Government of their earlier recommendations about the Performance-cum-Programme budgets besides the business-type budgets which the public enterprises might be encouraged to prepare to facilitate discussions in Parliament. As a result of such persistent demand from the Estimates Committee the Department of Economic Affairs in its Office Memorandum No. F-8(6)-B/60 dated June 12, 1961, addressed to all Ministries of the Government of India, drew their attention to the demand of the Estimates Committee requiring that the public undertakings should prepare Performance-cum-Programme statements besides business-type budgets for submission to Parliament. For this purpose the Estimates Committee had encouraged the undertakings to adopt the proforma in use in the United States under the United States Corporation Control Act, 1945. Accordingly, the Ministry of Finance recommended that the departmentally run undertakings in India may very well emulate the example of the Indian Railways in preparing a review of their performance for periodic submission to Parliament. On the other hand, the companies set up under the Indian Companies Act, 1956, and the corporations set up under the various statutes have to follow the provisions applicable to them as laid down in their respective enactments. Where no such specific provision has been made in regard to these matters in the relevant Acts, suitable instructions in this behalf were required to be given. The Memorandum, however, duly advised the various undertakings to adapt the specimen proforma suitably keeping in view the operational requirements of the various undertakings. It is true that, the leading enterprises in the public sector were quick in

introducing business-type budgets which are invaluable aids to management. Expert investigations have also been made about the feasibility of commercial budgeting and steps that need be taken in this direction in some of the undertakings like Posts and Telegraphs.

In the meanwhile the Ministry of Finance invited Frank W. Krause of the United States Bureau of the Budget to examine the question of Performance budgeting in India. On the basis of a reconnaissance conducted by him in April 1964 he made a case study of 3 departments, namely, Central Board of Revenue, Central Public Works Department, and National Small Industries Corporation on the basis of which he recommended the adoption of a comprehensive and clearly-phased plan of action to introduce Performance budgeting in all central ministries and related enterprises. Such a long-range improvement programme requires strong backing of the Cabinet and the Parliament. He has also emphasised the need for decentralised accounting and a single purpose functional classification at all levels of financial administration as the main lever of development administration.

The Indian Institute of Public Administration and the Management and Administration Division of the Planning Commission have also contributed a great deal in preparing the ground for an early switch-over to performance budgeting. With the assistance of the U.S.A.I.D., the Institute obtained the services of Carl W. Tiller, Chief of Budget Methods in the United States Bureau of the Budget for about six weeks in July-August 1964 and organised a series of lectures in which about 150 persons of financial and accounting background in the various departments of the Government and public undertakings participated.

The Management and Administration Division in the Planning Commission had made some pioneering efforts to convert the traditional budgets of some of the public undertakings on a performance basis. The following are the documents prepared by them :

- (a) Introduction of Performance Budgeting in Central Mechanised Farm (Suratgarh), January 1966 (Mimeo).
- (b) Introduction of Performance Budgeting in National Highways, February 1966 (Mimeo).
- (c) Introduction of Performance Budgeting in Telephones (Communications), February 1966 (Mimeo).

- (d) Linking of Heads of Departments and Budget and Account Heads, November 1965 (Mimeo).

An Appraisal

The Management and Administration Division has also prepared a discussion draft of a Memorandum on the Introduction of Performance Budgeting in India in February 1966 urging the need for speeding up of the process of conversion to Performance classification as a tool of modern management. The Memorandum has emphasised the advantages that are likely to accrue from organic integration of the processes of programming and budgeting when a single set of classification runs through all the stages of financial administration namely, preparation of the estimates, voting of demands, implementation, accounting, review and audit. Such a system would improve legislative review by presenting a comprehensive picture of either the operation of government, the economics of the operation, the benefits that flow from such operations or the relationship between the resources and the operations.

If the budget is a political and policy document it should be made intelligible to the average citizen. Only when he comprehends what the programmes of the Government are, what they would cost, who would pay for them, who would benefit by them and to what extent, can he exercise his franchise in the most effective way. Given the requisite level of literacy, the welfare content of a progressive budget expressed on an activity basis would strengthen the democratic process and evoke meaningful participation of the citizens in the implementation of the tasks set out in the budget. In other words performance classification helps to improve public relations by providing clearer information for a rational public appraisal of responsible Government.

If developmental effort is more than a grandiose paper plan, the various programmes contained therein should be made operational. Often its implementation is delayed and distorted partly by faulty phasing and scheduling and partly by apoplexy of administrative and financial powers in the higher echelons and anaemia in the grass roots of administration. Apart from top heavy administrative structures, excessive criss-crossing of organisational and functional responsibilities seem to block a smooth process of a rational delegation of powers. It may not always be possible to bring about a perfect harmony between organisational and functional categories.

With a great degree of synchronisation between programme and organisational responsibilities, is decentralisation will be effective enabling on-the-spot administration and unity of the command.

Decision-making at the different levels of the organisational hierarchy will have to be supported by an efficient system of information and communication. A rational review of the order of priorities, allocation of resources and the structure of responsibilities will be possible only when the requisite cost and work data are made available at appropriate levels of decision-making. Besides, managerial control based on the exception principle will not be effective without adequate cost information (based on unit costing and standard costing wherever feasible). Only performance classification of expenditure accompanied by decentralised accounting and systematic reporting could provide such informational support. Such a transformation would also facilitate the introduction of cost audit as an important ingredient promoting efficiency and economy in the operating agencies.

Organic integration of the processes of planning, programming and budgeting would be facilitated only when functional classification is applied at all the stages of financial administration. If annual budget is essentially an instalment of the long-term development plan relating to the public sector the traditional classification budget does not facilitate the inter-weaving of the physical and financial aspects at various operational levels. The advantage of Performance budgeting in such a situation is that it brings the financial and physical aspects together right from the embryonic stage of a proposal to the final emergence of it as a scheme. To sum up, Performance budgeting helps to bring about an organic integration of planning, programming and budgeting, provides for more effective controls; makes legislative control more meaningful; helps to gear to process of decentralisation of authority in conformity with real responsibility and helps to improve public relations.

There are certainly a few pitfalls and problems which confront attempts at introducing performance budgeting. For instance, functional classification is regarded as the cope stone of Performance budgeting. But the diverse world of reality does not always lend itself to neat and discrete categories most useful for classification purposes. Hence, the problem of identifying appropriate and adaptable functional categories. Even where identification is

not difficult, the establishment of proper work units to measure such activities may be formidable especially in areas such as project design, surveys, research, foreign affairs, etc., which defy standardisation.

Further, performance budget aids but does not solve the greatest problem in budget, decision-making, viz; namely the comparative evaluation of projects, functions or activities, unless it is supported by cost-benefit analysis which itself is far from perfect especially when the indirect and intangible costs and utilities are involved in a big way. Even when these ensure a great degree of reliability they help to measure quantity and not quality. Sometimes, information relating to quantity may be obtained out of some descriptive material obtained from operating agencies. But quality control will require more elaborate and rigorous engineering and statistical devices designed for that purpose.

Sometimes, the classification developed may be much too broad to reveal the significant programmes and activities of the agencies and to serve as a firm basis for budgetary decisions and management. Even when the classification is alright, sophisticated tools such as PERT and Line of Balance Technology or Critical Path etc., will have to be supplemented to costing and other aids provided by the Performance system in order to manage the construction of new projects especially when there is very little cost precedent. Besides, Performance budgeting may tend to encourage over-decentralisation and over-simplification of the appropriation structure and consolidation of function categories for purely budgetary purposes thereby relegating the important programme and management considerations to the background. It might also tend to proliferate the proformas making enormous claims on the accounting facilities with in the agencies.

Despite these pitfalls and formidable problem of work measurement and costing, Performance budgeting is bound to serve a very useful purpose in the context of planned economic development in a country like India. This explains the enormous concern displayed by the Parliamentary Committees for budgetary reforms. Though a simultaneous movement embracing all the elements of Performance Budgeting applicable to the Central, State and local governments is desirable, initial emphasis may be placed on the

problem of identification of programmes and evolution of suitable measure of work and costs in the Central Government. This should be a part of conversion plan with appropriate phasing over time, backed by strong legislative and executive support. All the departments and agencies should be actively associated with the conversion process. The leadership spearheading the change in each Ministry ought to be clearly identified. The Ministry of Finance should organise the requisite staff orientation and training. The conversion plan should also be made available to the State governments and the leading municipalities as part of an endeavour to induce them to adopt progressively the functional classification.

PART C

APPENDICES

1

PERFORMANCE AUDITING

T. P. Khosla

A NATURAL outcome of the fast moving industrial revolution and of the wide acceptance of the concept of welfare state in the current century is the growth in the activities of Governments. These activities, which have an impact on the life of the individual have in turn, led to an unprecedented increase in public administrative services and of enterprises sponsored by the State. There has thus been a tremendous enhancement of the cost of public services and we have now the phenomenon called 'Big Government'. In this new situation the arrangements for financial control evolved when the functions of Govt. consisted mainly, in the maintenance of armies for defence or of police force for internal order and staff for collection of taxes, have not proved adequate. The public as well as its representatives in democratic countries seek reassurance that the growth of public expenditure has not led to any laxity in financial discipline and that the state enterprises are operating efficiently. The reports published by the public sector enterprises or executive wings of the administration themselves may appear to the public like documents of self-justification which rarely show whether any mistakes have occurred or lessons learnt. Human nature being what it is, this is perhaps understandable as the interest in preserving secrecy of those in charge of expenditure of public money may sometimes be different from the dictates of public interest. While it remains true as ever, that the best assurance to the public consists

in an independent and impartial audit which has a right to call for information and accounts from the executive and can report its findings to the highest organs of the State, there has to be a modification in the methodology employed for conducting audit investigations and a widening of the horizon of those who conduct this audit. This change in methodology and a widening of the outlook of auditors has led to what is termed as 'efficiency or performance audit'.

In earlier days, an important function of the auditor was to check upon the 'legality' of the transactions. This consisted mainly in ensuring that the transactions have been 'properly vouched for' i.e., sufficient documentary evidence is available to show their nature, their reality and their legality. Transactions of receipts or payment which were not vouched would not be acceptable without a detailed explanation and independent corroboration. The next stage was to ensure that each item of income and expenditure has been properly incorporated into the accounts at the appropriate time. The accounts themselves must be correctly totalled and balanced at prescribed intervals. It was also to be seen that each payment made has been duly authorised. The lowest common denominator of audit was thus 'regularity' i.e., a seeking of conformity with the relevant accounting, administrative, budgetary and financial regulations as well as with the laws of the land. This 'tick and turn over' process of audit may look common-place but this was and remains the most important test providing a guarantee that the financial administration is being conducted at least under prescribed rules or orders. The other important duty of the auditors is to ensure that the executive operated within the frame-work of legislative authorisations. It may be that the legislature has not only authorised the spending of large total sum but indicated in detail the objects upon which that sum has to be expended and upto what figure in each case. The budgetary system of financial control would be worthless and control over the purse by the legislature become an empty phrase if the executive were to ignore the authorised individual totals even if it respected the overall figure of approved appropriations. Audit had, therefore, a responsibility to watch out that wherever this happened, the matter was reported to the legislature.

In addition to the above there is also what is known as audit against propriety. In this, audit, has to bring out cases involving improper expenditure or waste of public money or stores even though

the accounts themselves may be in order and no other irregularity has occurred. As stated by a writer 'propriety audit' involves an examination of the wisdom, faithfulness and economy of the expenditure under audit. There are no rules for the audit of this expenditure and its purpose mainly is to secure a reasonably high standard of public financial morality or sound financial administration. In this the auditor demands not merely whether there is any quoted authority for expenditure but will also investigate the necessity for it. He will examine whether the result achieved could have been attained, by spending less. In short, he will ask every question that a tax payer bent on receiving the best value for his money may ask. By and large, however, audit against propriety involved the audit of individual transactions. The audit of big schemes or projects involving large developmental expenditure involving thousands of transactions has now been undertaken as a part of Performance Audit.

Due to the complicated pattern of activities in the modern State, the large canvas these activities cover and the phenomenal increase in the expenditure incurred, an audit charged with ensuring 'regularity' or compliance with 'appropriation' even though independent, is totally inadequate. At best 'regularity' is a negative criterion; it is the absence of technical 'irregularity'. Audit based on 'regularity' alone is, therefore, in a certain sense inadequate. This is also true of audit against 'propriety' since it does not concern itself with the efficiency or economy of administrative actions in relation to large schemes. Audit limited to regularity does not provide adequate opportunities for suggesting improvement, simplification, rationalisation or reform. It is solely responsible for enforcing the rules or bringing to light infringements thereof. The most wasteful, extravagant and ill-planned activities are sometimes quite 'regular' in a technical sense and these may not, therefore, be noticed in audit at all except when any individual transaction thereof is challenged on grounds of propriety. While this may be all right for the limited purpose of ensuring that there are no individual irregularities there is a need in the present-day situation for audit to move forward so as to bring within its purview an entire scheme, project, venture, or industrial undertaking. This calls for an advance beyond 'regularity' or the audit of individual transaction against propriety. It is only in this manner that audit can cooperate in solving the awesome administrative

problems of a modern State. This advance beyond regularity has come about as an instinctive readjustment in the procedures and visions of audit. This readjustment, which has released the energies of audit for making growing contributions to the development of public administration as a whole, has also been facilitated by a more liberal interpretation of the statutes governing the functions of audit in various democracies. That this advance beyond regularity in its scope, is audit in its most developed form was recognised in a passage penned by a Magistrate of the *Cour des Comptes* in France as under :

"In its most rudimentary form, state audit limits itself to checking total of account, to comparing the balance with the cash in hand, to ticking the vouchers which guarantee the reality of transactions. It does not permit itself to judge these transactions on their merits, much less to evaluate through them the performance of administrators; it will discover among the records, without making any comment, the receipt of taxes whose costs of collection are disproportionate to their net product, the making of useless payment rendered by the mere fact that they are charged to voted funds and supported by vouchers. In its most developed form on the other hand, state audit..... pursues its investigation on all levels and by every means, in order to inform the Prince about the quality of administration. Under such a system it does not suffice that transactions are legal or regular, they must also be in conformity with the demands of a healthy conduct of business".

In a brief but stimulating paragraph the accountant Magistrate has brought out clearly the difference between audit based on regularity and the one based on efficiency as also the overwhelming need for the latter.

Let us now have a look at the provisions made and the practices adopted in the great democracies of the West for conducting efficiency audit.

In the USA the Budget and Accounting Act of 1921 charged the Comptroller to 'investigate all matter relating to the receipt, disbursement and application of public funds. The word, application, here has a special significance and was specially introduced at the instance of a Senator anxious to secure for the Comptroller General in the

States has also to make reports to Congress and to the President upon request in which he is to make 'recommendations looking to greater economy and efficiency in public expenditure'. On the basis of these provisions it is open to the Comptroller General to apply efficiency or performance audit upon the broadest principles. The Manual of the General Accounting Office issued in the States provides for a comprehensive audit to be conducted of which one of the objectives is to determine whether 'the Agency is carrying out only those activities or programmes authorised by the Congress and is conducting them efficiently'. One of the Directors of that office explained the scope of comprehensive audit in 1954 to say that this audit is to determine whether the Agency has conducted its activities 'in an effective, efficient, economic fashion'. It is clear that this objective is quite a long way forward from the mere audit of 'regularity.'

The Chief Auditor in Germany is required under law to investigate in particular 'whether institutions have been maintained, posts retained or other Reich expenditure incurred which could have been eliminated or reduced without jeopardising the aims of administration'. In fact, the Chief Auditing authority there is also concurrently the Federal Commissioner for efficiency in public administration, who is authorised to make investigations and recommendations on his own initiative. He is to make efficiency audits. Although his reports go to the Minister concerned, a copy thereof is also sent to the Budget Committee of the German Parliament who use its influence in this matter when the estimates are submitted to it for approval.

France has gone one step better and set up an extremely high powered Committee on which are represented the Members of the Assembly and the Senate, some of the highest officers in the Civil Services and Armed Forces and the nominees of the Trade Unions. The Committee is presided over by the Premier. Its task is to 'seek and recommend measures appropriate to reduce the cost and improve efficiency.'

In the U.K., however, the development of efficiency audit as an instrument under external and independent control has to be brought about. At present the subject remains as the exclusive responsibility of O & M in big Departments. The internal status of these Units may sometimes make it difficult to ensure independent reporting. This seems less than adequate and points perhaps to the need for some fresh thinking.

In our own country with manifold increase in the activities of Government there has been a radical change in the pattern of governmental expenditure. There are large development projects of various types as also welfare and social activities launched under the Five Year Plans. Government is making huge investments in these ventures and spending substantial sums on these programmes. There is, therefore, a natural desire on the part of Parliament and the public to know exactly the results of these investments of Government. These development programmes and welfare Schemes are conducted mainly through three different types of Agencies. The role of the C. & A. G. in relation to each of these Agencies is also therefore, different. These are :

- (a) activities conducted through Government Departments such as running of Hospitals, Community Development Projects, etc., etc. In addition, there are Undertakings of a commercial nature also run departmentally like the Railway, Delhi Milk Scheme etc. Under the Constitution, these activities fall within the scope of audit of the C & A G ;
- (b) activities conducted through statutory Corporations such as L.I.C., Food Corporation, Damodar Valley Corporation etc. In the statutes setting up some of these Corporations the responsibility for audit has been entrusted to C & A G. In certain others, however, there is no such provision. Examples of the latter type are the Life Insurance Corporation and the Food Corporation ;
- (c) activities conducted through Joint Stock Companies.¹ These Companies have been set up under the Indian Companies Act and most of the important Industrial and Commercial activities of Government are conducted by creating such Joint Stock Companies. Examples would be the Heavy Electricals, Bhopal, Hindustan Housing Factory, Indian Drugs and Pharmaceuticals Ltd. etc. etc. The Indian Companies Act makes a provision for conducting audit of these Government Companies in the following manner :

¹ Any Company in which not less than fifty one per cent of the paid-up share capital is held by Government (Section 617 of Act).

- (i) their Auditors drawn from amongst the registered firms of Chartered Accountants, are appointed on the advice of the C & A G. The reports of these Auditors are submitted to the C & A G who has a right to comment thereupon ;
- (ii) the C & A G may give directions to these auditors regarding the manner of audit etc. ; and
- (iii) the C & A G may himself or through some other person conduct a supplementary audit. It has thus been ensured that an audit of these Companies is conducted by independent and impartial auditors whose reports are laid before parliament.

The onerous responsibilities laid by the Constitution and the laws on the C & A G have called for a new thinking and conducting of what has been called efficiency-cum-performance audit. This technique has been introduced in the Indian Audit Department in recent years. In a paper prepared for a Conference of the Commonwealth Auditors-General, it was stated as under :

“We have therefore come to the conclusion that we must conduct what may be called Efficiency-cum-performance Audit. Broadly, the object of such audit would be to ascertain whether :

- (a) such undertakings are being run efficiently and their operations conducted economically ; and
- (b) they are producing the results expected of them.

In regard to the first objective, the broad lines of examination may be of the following nature :

- (i) whether technical estimates or detailed programmes and cost schedules are being framed and the same are being adhered to ;
- (ii) whether the excesses over the estimates or the delays in executions are occasioned by inefficient handling, wastes etc., or due to indifferent preparation of original estimates ;
- (iii) whether there have been any serious avoidable delays in the progress of works and scheme resulting in crease in the total cost of the scheme

- or any loss of revenue due to delayed execution or holding up of connected schemes ;
- (iv) whether there has been any wasteful expenditure including that resulting from lack of co-ordination amongst several aspects of the scheme, such as staff being engaged long time before the procurement of machinery etc ;
 - (v) whether there has been any waste due to some facilities (buildings, equipment etc.,) on which expenditure has been incurred in the scheme ;
 - (vi) whether there have been any serious or recurring losses ; and
 - (vii) whether the performance of cost compares well with the results obtained in respect of similar schemes in other fields in public or private sector.

In order to examine how far a particular activity is producing the result expected of it, it would be necessary to ascertain :

- (i) how far physical targets have been achieved within the estimated time ;
- (ii) how far any returns, where these were anticipated are actually occurring ; and
- (iii) how far the physical purpose or object of the expenditure has been achieved. For instance, in the case of the Irrigation-cum-Electricity Projects, its should be ascertained if the estimated supply of water for irrigation purpose and power has actually become available as a result of the completion of the projects and whether their actual utilisation is to the extent anticipated.

In regard to activities conducted in the form of joint stock companies, considerable assistance in this task is being given by the firms of accountants appointed as their auditors. As indicated earlier directions have been issued to them and they have to submit a report on the matters included therein. But as it has not been possible to conduct the performance audit through the agency of chartered accountants, this is arranged as far as practicable by the Commercial Audit Deptt. under the C & A. G. to ensure that it does not result in going over the field already covered by them.

Recently, there has been a modification in the arrangements for the audit of commercial undertakings as an Audit Board has been set up. The Audit Board will be headed by a Chairman who will be ex-officio Additional Deputy Comptroller & Auditor General. Part-time members of this Board will be coopted who may be technical experts. This is designed to improve the arrangements for audit of the commercial undertakings.

It is, however, to be appreciated that technique has to vary from project to project and from scheme to scheme and the system to be applied in a particular case has to be developed in the light of actual experience.

In reporting to Parliament the results of efficiency-cum-performance audit, care is taken to avoid criticism in cases where although the original anticipations have not been realised there are no plausible indications of waste, bad planning or inefficiency. Thus, inefficiency if excesses over original estimates of expenditure have been occasioned by unanticipated rise in cost of material, new or unforeseeable items of works discovered as the work progressed which could not have been reasonably anticipated, these would not form the subject matter of comment.

The audit report submitted to Parliament on government commercial undertakings have been divided into three parts.

The first part reviews the financial results of the working of commercial undertakings and discusses generally the results of the year under review compared to those anticipated and to those of the previous year. It discusses broadly the main reasons for failures of achievements in particular cases and is intended mainly to give a general picture. For the second part, each year a certain number of undertakings are subjected to a detailed review. This review is confined to the working of some of the organisations which have been in existence or gone into production for at least five years. The nature of the report made varies from undertaking to undertaking but an idea of the contents will be obtained from the headings of the review of the Steel Projects. These are :

- (1) Variations in project estimates as a whole and of individual plants.
- (2) Costs on the townships and other ancillaries.
- (3) Delays in erection.

- (4) Delays in commissioning.
- (5) Targets and actual achievements.
- (6) Costs of production compared to statutory prices fixed by government.
- (7) Working of the agreements made with consultants and contractors.
- (8) Stock shortages.
- (9) Demurrage charges paid for delays in turn-round of railway wagons.
- (10) Financial results as depicted from year-to-year.
- (11) Matters reported by the auditors such as account keeping, internal control, rejections, store-keeping etc.

The third part deals with the annual working of some of the schemes for which no detailed review is prepared and the results of these schemes.

As the periodical reports of the C & A G would show, efficiency-cum-performance audit has yielded fairly good results. The attention of Parliament has been drawn to cases of defective planning, inefficient execution and wasteful methods wherever these have attracted the notice of audit. The Public Accounts Committee has taken up these cases with the executive and sought assurances for the future. These have been forthcoming and in a majority of cases remedial action has also been taken. Case history of three such cases as well as the observation of this august committee of Parliament on these cases, are annexed to this paper. Some aspects in these cases deserve special attention.

In the case of audit point raised in relation to Railways, apart from the aspect that the expenditure incurred on the provision or additional railway facilities was far in excess of that provided in the III Plan, the fact that these additional facilities themselves did not prove to be fully justified in the context of actual freight offered has also been commented upon. The somewhat inadequate manner in which the figures for these additional requirements were worked out at the beginning and the absence of an efficient periodical review to verify whether or not the original estimates called for a change were pointed out. The PAC commented upon these aspects and the highest railway officers accepted the observations. Noting lapses such as these has been possible only because of the changed audit

attitude and the widening of its horizon. If as a result of the audit observations and the comments of the P A C, improvement in administration in future does occur, I have no doubt audit based on efficiency-cum-performance would have served an excellent purpose. The estimates of the requirements of resources for similar items in future may, therefore, be nearer to the needs of the situation and to that extent an important public objective would have been realised.

In the case of the Delhi hospitals, audit has drawn attention to the fact that the rate of purchases of similar supplies by the three hospitals in Delhi differs from hospital to hospital. Here also if, as we may legitimately expect, there is better coordination in regard to the requirements for these hospitals in future, the supplies could be obtained at the cheapest possible price.

The third case relates to the audit of a public sector undertaking set up under the Indian Companies Act.

The comments related to :

- (a) Delay in execution ;
- (b) Short-fall in achievement ;
- (c) Delay in taking a decision on pricing ;
- (d) Idle machinery ;
- (e) Low percentage of staff utilisation ;
- (f) Defects in the costing system ; and
- (g) Heavy over-heads.

These comments have been made possible by examining the accounts of this concern under the scheme of performance-cum-efficiency audit. These were placed before the Committee on Public Undertakings who had other material on the same subject before them. The Committee regretted the inordinate delay in arriving at a decision regarding the extension of the jetty. They also conveyed their observation on the frequent change in ship construction schedules. On the question of pricing policy, the Committee felt that the principles of giving subsidy to cover all excess cost of construction of a ship over the price charged to the buyer was not conducive to an efficient performance.

The Committees mentioned above are really miniature Parliaments. These consist generally of representatives of different political parties both in Government and in the opposition. The

fundamental difference between the Legislature and these Committees is that while the former works on party lines the latter work on non-party lines. This gives these parties an immense influence which is at par with the heavy responsibilities they bear. Our Constitution has restricted the functions of the audit watchdog to the mere act of barking. It is not permitted as in some other countries to bite also. But to keep the watchdog healthy, alive and alert and to catch the evil-doer, it is essential that prompt notice is taken of its barking by the master. This is precisely the function which these Committees discharge.

It may be clarified that the endeavour in recent years has been not only to high-light the irregularities but to present to the Legislature an idea of the working of individual schemes and to bring out the irregularities in the context of the entire scheme. In this manner, the past practice of making a mere mention of individual irregularities without giving the background which may give a distorted impression has been sought to be corrected.

As the basic purpose of performance audit and efficient administration is identical there should be mutual understanding and close cooperation between the two. Thus, while the administrator should appreciate more readily the audit point of view, the audit criticism should be made with due regard not only to the magnitude of the task before the administration but also of its difficulties.

The rules and precepts of audit are not immutable as the laws of the Medes and Persians. The role and concept of audit have changed in a changing world. With the introduction of performance system of budgeting, a part of the information which audit seeks to elicit in the course of performance audit will be available in the budget documents in terms of physical targets, achievements etc. However, as performance budget can by its nature be applied with advantage to repetitive types of activities generally speaking, there will be left a vast field for audit still. And even where performance budget is introduced, there will be immense scope for audit to check up whether the activities were carried out efficiently and with the least cost. Again, if in the planning of projects and in their construction adequate use is made of the latest techniques such as PERT, inventory control or material management and management accounting, it will no doubt reduce the work of audit as these systems call for

automatic checks to reduce wastage and improve efficiency. To what extent this is achieved in practice and the reorientation of audit under changed circumstance is in the womb of future.

It may be added that efficiency-cum-performance audit by an independent external agency cannot be replaced by any scheme of internal audit, O & M programme evaluation operating under the aegis of the executive government. The sweep and approach of the two are also different from each other. Audit has to range over a wider field including financial, whereas evaluation programmes are concerned mainly with the administrative. Again, while the former is objective and can take a detached view, it may not always be possible for the latter so to do. To a public long accustomed to hearing promises and seeking lists of achievements published, it is important that an assessment by an external agency should also be made available. In saying so, I am not detracting from the extremely valuable work of internal agencies. They must continue. Perhaps, a good administration would be one giving full scope to both so that each can fulfil complimentary role to the other.

ANNEXURE

CASE HISTORY NO. 1 : THE RAILWAYS

EXTRACTS FROM THE AUDIT REPORT FOR RAILWAY, 1967.

Financial Review of the Third Five Year Plan of the Railways

The year 1965-66 was the last year of the Third Five Year Plan. This chapter reviews the progress achieved by the Railways during the Plan period.

PLAN OUTLAY AND ACHIEVEMENTS

The anticipated expenditure during the Third Five Year Plan on Works, Machinery and Rolling Stock Programme and Inventories of Railways was Rs.1,325 crores of which Rs.505 crores was expected to be financed from their own resources, that is, from Revenue, Depreciation Reserve Fund and Development Fund. The actual outlay amounted to Rs.1,686 crores of which the Railways' contribution was Rs. 546 crores.

The actual outlay and physical achievements as compared with the anticipated expenditure and physical targets of some of the major items are indicated below :

	Physical	Targets Expenditure in crores of Rs.	Achievements Physical	Expdr. in crores of rupees
1. New Lines	1,920 Kms.	147	1,801 Kms	212
2. Track renewals		170		216
(a) Complete tracks ...	3,000 Kms.	70	9,657 Kms.	81
(b) Rail renewals	4,000 Kms.		2,785 Kms.	
(c) Sleeper renewals ...	3,600 Kms.		3,907 Kms.	
3. Electrification	1,760 Kms.	70	1,678 Kms.	81
4. Line Capacity Works ...				
incl. Doubling	2,560 Kms.	183	3,228 Kms.	319
5. Rolling Stock.....		510		542
(a) Locomotives	1,764 Nos.	}	1,864 Nos.	}
(b) Carriages	7,433 Nos.		7,362 Nos.	
(c) EMU Coaches ...	1,027 Nos.		657 Nos.	
(d) Wagons	1,17,144 Nos.		1,44,789 Nos.	
6. Workshop, Machinery and Plant		62		59
7. Stores Suspense		35	...	50
8. Staff Quarters and Staff Welfare		50	...	61

Annexure

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Note: The targets under some of the items had been revised upwards in 1964-65 as below :

New Lines...	2,200 Kms.
Electrification...	1,770 Kms.
Doubling...	3,250 Kms.
Locomotives...	1860 Nos.
Wagons...	1,57,678 Nos.

The total commitments for the new works etc., sanctioned during the Third Plan amounted to Rs. 2,888 crores (including Rs. 247 crores thrown forward from the Second Plan) against which the actual expenditure was Rs. 8,686 crores. The balance thrown forwards to the next Plan thus amounted to Rs. 495 crores.

The increase in the plan outlay was attributed by the Ministry of Railways to increase in costs mostly due to cumulative effects of steadily increasing prices of steel, cement and non-ferrous metals throughout the Plan period; enhancements for customs and excise duties and also increase in inventories incidental to the extension and diversification of activities and increase in prices.

GROWTH OF TRAFFIC

(a) Goods Traffic

The originating goods traffic moved in the last year of the Second Plan was 156 million tonnes. The Third Plan outlay of Rs. 1,325 crores was based on the expectation of increased traffic with a target of 349 million tonnes of originating goods traffic for the last year of the Plan (1965-66). While the outlay had increased by about 27% over the anticipated expenditure, the traffic moved in 1965-66 (203 million tonnes) was 18% less than the anticipated quantum.

The year to year materialisation of traffic was also below expectations from the beginning of the Plan period. At the time of deliberation of the Railway convention Committee, 1960 which considered the Railway finances for the five year period ending with 1965-66 coinciding with the Third Five Year Plan, the Ministry of Railways expected to reach a target of 239 (later revised to 249 million tonnes) by 1965-66. The anticipated year to year traffic compared with actual materialisation is as under ;

	As anticipated at the time of 1960 Convention (In million tonnes)	Actual traffic moved
1961-62	175	160
1962-63	187	179
1963-64	200	191
1964-65	214	104
1965-66	239	203
Total	1,015	927

The total traffic of 1,015 million tonnes during the Plan period anticipated in 1960 comprised 199 million tonnes of Railways' own traffic (including coal for their use) and 816 million tonnes of revenue earning traffic. While the actual revenue earning traffic was 723 million tonnes (about 11% less) the Railways' own traffic was 204 million tonnes (an increase of 2.5%) during the Plan period. The commodity-wise break-up of the actual traffic carried is as follows :

Particulars	Traffic anticipated in 1960 (In million tonnes)	Traffic handled
1. Revenue earning traffic		
(a) Coal...	234	202
(b) Raw Materials for steel plants other than coal	86	77
(c) Finished products from plants. ...	34	29
(d) Cement. ...	50	37
(e) General Goods ...	412	378
2. Railways' own traffic		
(a) Coal ...	99	107
(b) Other materials ...	100	97
Total	1,015	927

The Ministry of Railways stated that the Third Plan began with a shortage of rail capacity for freight transport, mainly due to the progressive accumulation of transport demands for a wide range of commodities inherited from the first two Plans. This was success-

fully overcome by late 1962. Still the main effort was to provide adequate capacity to overtake all anticipated needs and some small extra limited capacity to take care of unforeseen demands etc. But in the later years of the Plan, mainly due to smaller growth of traffic in the Coal and Steel industries, demand for rail transport slowed down and Railways had to rephase their development programmes and cut back their rolling stock procurement. At the end of Third Plan, it was stated, there was marginal spare capacity on the Broad Gauge, capacity and demand were practically balanced with no margin available for seasonal peaks or changes in pattern of movement or transshipment at the break of gauge points.

(b) Passenger traffic

In the case of passenger traffic, an increase of 3 per cent per annum in the non-suburban traffic was anticipated during the Third Plan and the actual increase was 3.4 per cent.

Extracts from the Twenty Second Report of Public Accounts Committee

The above observations were reviewed by the Public Accounts Committee. An extract from their 22nd Report is reproduced below :

1.22 From the facts placed before them, the Committee cannot help feeling that, from the very beginning, planning in respect of goods traffic was far from realistic. As stated in the Ministry of Railways note (para 1.4), when the first estimates were prepared in 1960, the production targets in the major industrial sectors had not taken final shape and a precise indication about financial outlay was not available. The final estimates included in the Plan were, therefore, tentative. In fact the Third Five Year Plan specifically stated:

"Furthermore, since the overall estimates of traffic can only be treated as tentative at this stage, they will be subject to constant review in the light of the actual trends."

1.23 The Committee regret to notice that subsequent reviews as contemplated in the Plan were not made and rail programmes not coordinated with the production levels reached in the major industries. The actual materialisation of traffic from year to year was not kept in view.

- 1.24 It is not business-like for a commercial organisation like the Railways merely to accept the statements/assessments of other Ministries without critically examining the position themselves. Even when estimated traffic was not forthcoming, the Ministry of Railways did not promptly reduce or revise the programmes merely because "everybody was confident" that they would produce the goods.
- 1.27 The Committee note that the comparisons of traffic anticipations and actuals made in the note submitted by the Ministry of Railways are based on the revised estimates prepared in January, 1962, and November, 1963, and not on the estimates prepared for the Conventions Committee in October, 1960 and for the Third Plan in March, 1961. As indicated in the Audit Report there was a wide gap between the actual traffic and that anticipated in October, 1960. Even in the case of estimates of January, 1962, the Committee note that, while the increase in traffic estimated for the first two years of the Plan over the traffic moved in the last year of the Second Plan was only 21.0 million tonnes, an increase of 35.0 million tonnes was anticipated over the next three years. The Committee are, therefore, forced to conclude that while formulating their Plan the Ministry of Railways did not pay due regard to the actual trends of traffic. It is regrettable that heavy capital expenditure was incurred in creating traffic capacity far in excess of the requirements on the basis of mere hopes and expectations. Scarce resources which could have been utilised for more productive purposes were blocked.
- 1.28 The part played by the Planning Commission also calls for comment. The Commission, which was in over-all charge of laying down the targets and for coordinating the efforts of different sectors to achieve the objectives, did not exercise any check on the Railways incurring heavy capital expenditure without correlating it to traffic requirements. Even as late as November, 1963, at the time of the Mid-term Appraisal of the Plan, although it was evident that goods traffic would not come up to expectations, the Ministry of Railways were allowed to carry out [the rail transport programmes.

- 1.29 In reply to a further question from the Committee as to what checks were proposed to be adopted to avoid recurrence of such a situation, the Chairman, Railway Board replied :

"We have since become wiser in certain ways. One of the ways is, that at three months intervals we review these things. We have toned down various forecasts and Plan estimates. Even Fourth Plan targets have been cut down severely.....We hope we will be able to keep track better."

The Financial Commissioner further explained :

"We all learnt a lesson from this experience"

- 1.30 The Committee trust that the Ministry of Railways will put to better use the existing staff for planning at different levels both in the Railway Board and at Headquarters of Zonal Railways in order to avoid the recurrence of similar situation.

The observation of the Public Accounts Committee as contained therein in the 42nd Report of PAC (Civil), 1965. Appendix XII to the Audit Report (Civil), 1965, is given below :

2.45 Appendix XII to the Audit Report indicated that medicines were purchased by the different Hospitals from the same firm at different rates in a given period resulting in extra expenditure.

2.46 The Secretary, Ministry of Health explained in evidence that the two Hospitals mentioned in the Report namely Irwin Hospital and Safdarjung Hospital were functioning under different management—one under the Delhi Administration and the other under the Ministry of Health. He, however, admitted that results as indicated in the Audit Report had been unsatisfactory and that he proposed to appoint an officer specially to go into these purchases carefully, with a view to find out if there was anything serious behind them. On being pointed out that the purchases were made during 1963 but no action had been initiated in this regard, the Secretary assured the Committee that if an officer was found guilty, suitable action would be taken against him even though he had been transferred out of the Organisation. Discussing further the items mentioned in the Appendix, the Committee enquired whether any action had been taken against the firm of manufacturers which had supplied the same medicine at different rates to the two Hospitals within the same period. The Director-General of Health Services informed the Committee that supplies had since been stopped for the last two years. The Committee desired to know the date from which the firm had been removed from the list of suppliers since according to the Audit Report purchases were being made as late as in December, 1963. The witness promised to furnish the information to the Committee.

2.47 In a note submitted by the Ministry, it has been stated that procurement of supplies from the firm was suspended after August, 1962 when a registered list of standard and reputed manufacturers was drawn up. It has been further stated that the firm was not included in the list on account of

CASE HISTORY NO.—DELHI HOSPITALS

EXTRACTS FROM AUDIT REPORT (CIVIL) 1965

Instances showing medicines purchased from the same firm at different rates by different hospitals in Delhi in a given period :

Rates paid for 100

Name of the medicine	Period of Purchase	Name of supplier	Irwin Hospital Rs.	Safdarjung Hospital Rs.
1. Injection Scolin	June to Oct., 1963	M/s. Glaxo Lab.	68.78	70.52
2. Injection Methergin.	June to Nov., 1963	M/s. Sandoz Lab.	69.56	66.08 & 62.40
3. Injection Insulin Zinc.	April 62 to March, 63.	M/s. Delhi Medical Stores	220.00	301.72
	April 63 to March, 64.	—do—	214.66 to 220.00	304.50 to 305.06
4. Inj. Vit. 'B' Complex, 10 cc.	April, to Sept. 62,	—do—	75.00	78.00
	April, to Sept. 63.	—do—	84.00	72.80 to 73.50
5. Inj. Vit. B ₁ 10 Mg.	Dec., 1963.	M/s Gurco Pharma.	62.00	90.30
6. Inj. Vit. B ₂ 500 Mgm.	April 63 to March, 64.	—do—	223.00 to 236.00	252.00 18.33
7. Inj. Vit. 'C' 500 Mg.	April, 63 to March, 64.	M/s Kanti Lal R. Parikh	15.77 to 16.00	
8. Inj. Vit. 'D'	April 63 to March, 64.	M/s Delhi Medical Stores	25.00	31.50

many complaints regarding the inferior quality and efficacy of their products from the clinicians working in the C.G.H. Scheme.

- 2.48 The Committee are surprised to note from the Audit Report that even after procurement of supplies was suspended from this firm in August, 1962, purchases were still made during April 1963 to March 1964. They desired that circumstances under which purchases were made from the firm in question may be enquired into and responsibility fixed. The Committee may also be informed of the result of enquiry proposed to be conducted by the Secretary into the cases of purchases mentioned in the Audit Report.

CASE HISTORY NO. 3 : HINDUSTHAN SHIPYARD LTD.

EXTRACT FROM THE AUDIT REPORT (COMMERCIAL) 1966.

Expansion Works

Extension of Jetty

In order to provide facilities for construction of 4 ships per year, the Company, with the approval of the Port Authorities decided in 1958, to extend the existing jetty towards the east. The work on the project was, however, awarded to the contractor only in April, 1964 and scheduled to be completed after a period of 28 months.

The delay in the finalisation of plan regarding extension of jetty has not only acted as an impediment to the maintenance of production schedule but resulted in an increased outlay of Rs. 250 lakhs (approximately) owing to the increase in the prices of materials.

Targets and Achievements

(i) The targets and achievements in respect of keel laying, launching and completion of ships for the last three years are indicated below :

	1962-63		1963-64		1964-65	
	T	A	T	A	T	A
(a) Keel laying	3	2	3	2	2	2
(b) Launching	4	3	3	1	3	2
(c) (i) Completion	4	3	3	2	3	2
(ii) D.W.T. of ships completed	36,900		24,600		13,200	

T...target
A...achievement

Pricing Policy

In para 99 of the Audit Report (civil), 1962, it was pointed out that the existing procedure under which Government paid the subsidy on the construction of ships on the basis of the difference between the price settled between the purchaser and the Shipyard and the actual cost of construction in the Shipyard as certified by the Chief Cost Accounts Officer was defective and needed review. No final decision in the matter appears to have been taken so far.

Foreign Exchange

(ii) *Idle Machinery*—On 31st March, 1965 plants and equipment, e.g. cranes, planing machines, electric equipment, etc., worth Rs. 25.62 lakhs purchased by the Company during the period from 1955-56 to 1964-65 to meet the anticipated requirement were lying un-installed. The years of purchase and the value of the machinery are indicated below :

Year of purchase	Value of machinery Rs.
1955-56	54,794
1956-57	21,319
1957-58	3,653
1962-63	19,738
1963-64	14,65,849
1964-65	8,53,708
Items for which date of purchase is not known,	1,42,592
Total	25,61,653

In addition, dismantled machinery worth Rs. 47,464 which is not required for use awaits disposal (September, 1965).

Staff Strength

The following table indicates the total number of men employed by the Company for the last three years :

Year	Technical	Non.technical	Skilled and semi-skilled workers	Un-skilled Workers	Total
1962-63	533	512	3051	1223	5319
1963-64	562	645	3135	1081	5423
1964-65	587	671	3172	1071	5501

In pursuance of its decision of 24th March, 1964, the Company obtained the advice of the Institute of Works Study, Mussoorie, Uttar Pradesh in the matter of staff strength. In its preliminary report submitted in July, 1964, the Institute reported that the manpower utilisation in the Shipyard was about 38.6 per cent. The low percentage of staff utilisation was attributed by the Institute to lack of adequate work-load and incentives.

Costing

(i) *System* : The present system of costing suffers from the following defects :

- Standard costing has not been introduced.
- Comparison between estimates and actuals is rendered impossible as estimating is done on a very broad basis for ships and not for jobs.
- Credit for steel scrap is being taken on an estimated basis instead of on the basis of actual weighment.
- Estimates regarding quantitative requirement of stores in respect of major items like paints, cables, rivets, furnishings, electrodes, welding gas, wire ropes, pipes, etc. are being prepared.
- Norms for steel consumption and man-hours have recently been laid down, but the comparison of estimates with actuals has not yet (January, 1966) been done.
- Estimates prepared by the Company are not in consonance with the detailed jobs which are available for cost accounting purposes.
- Estimates of labour with which actuals could be matched for effective control are not prepared.

As regards item (b), (c), (d) and (f) the Management have stated (January, 1966) that necessary action for removal of the defects is under consideration.

(ii) *Overheads* : The overheads in the Shipyard have been showing an upward trend as indicated below :

Year	Value of ship production	Overheads	Percentage of overheads to total value of production.
1962-63	483.68	94.77	19.59
1963-64	459.78	100.35	21.82
1964-65	417.58	106.34	25.47

Extracts from the 37th Report of the Committee on Public Undertaking (Third Lok Sabha)

It will appear from the above that a period of 5 years was taken in coming to a decision whether the extension of the jetty should be towards east or the west. The Port Authorities had in 1958 agreed to the extension of the jetty towards the east and there is no adequate evidence to suggest that they later on, amended the sanction. The Shipyard by delaying the finalisation of this scheme till October, 1962 has only hampered its production programme.

The Shipyard has been generally falling short of production targets. From the various replies given by the Shipyard, it is clear that the reasons for shortfall in production were not analysed till March, 1964 when the 13th Schedule was drawn up. Although the Shipyard had to be subsidised heavily during these years it seems that Government took no serious notice of the shortfall in production and allowed the shipyard to run at a heavy loss. The Committee recommend that, in future, reasons for shortfall in production should be analysed and pointedly brought to the notice of government and the Board in the year subsequent to be shortfall.

The Committee find that shortfall in production is generally attributed by the Shipyard to the unsatisfactory flow of materials. If flow of materials is taken as the major factor, it is surprising that no effective steps were taken to ensure or maintain the flow of materials. On the other hand, as facts show, the position was allowed to remain stagnant or even deteriorate year after year. It seems that the administrative Ministry also did not exercise effective control over the affairs of the Shipyard in this regard. Concreted efforts should be made to improve the production performance of the Shipyard.

It is clear from the above that the Shipyard drew up the schedules without benefiting from its past experience or taking into account all the factors which might affect their implementation. It appears to the Committee that the management's approach has not been sufficiently realistic with regard to availability and adequacy of ship-building material and its own capacity. The Committee feel concerned not only with frequent changes of schedules which hamper smooth production but also the consequent discouragement to buyers in placing orders on the Hindustan Shipyard. A schedule that needs to be revised every year has hardly any meaning. The Committee

recommend that while preparing schedules in future all the necessary factors should be considered carefully and once a time-schedule for constructing a ship is prepared, it should be adhered to, unless extraordinary reasons beyond the control of the management prevail.

It will be noticed that the element of subsidy is not only high but has also risen by about 100 per cent in respect of ships built recently. This shows that the Shipyard has failed to keep a check over its cost of construction. Payment of higher subsidies implies that the tax payer has to pay more and more for the failure of the management. The Committee suggest that the reasons for increase in costs should be analysed by experts not connected with the Shipyard and steps taken to bring them down.

The Committee consider that the principle of giving subsidy to cover all the excess cost of construction of a ship over the price received by the Shipyard is not desirable in as much as it does not give necessary incentive to the Shipyard to improve its performance. In the Committee's view, the buyer should also not be asked to pay appreciably more than what he would have paid for a similar ship constructed elsewhere. So far as the shipyard is concerned, if any subsidy has to be paid to it, Government should lay down a norm for the purpose with an upper limit instead of paying in full the difference between the cost of construction and the sale price. The above procedure would save Government and the tax payer from bearing the entire burden of the deficiencies of the shipyard and at the same time induce the Shipyard to reduce its cost of construction.

2

WORKSHOP EXERCISE : WHAT IT IS.

K. B. Iyer

Introduction

ONE of the teaching aids employed in the Courses on Performance Budgeting conducted by the Financial Management Unit of the Institute is the Workshop. It consists of practical exercise sessions, where the concepts of Performance Budgeting are tried out in however limited a fashion, with given conventional budgets. The other methods of instruction are lecture-discussions, case-studies and educational films (when readily available). Generally 46-47 hours of total instructional time is available in a Course. Another 4-5 hours are devoted to discussions/debates of the workshop reports. *What, How Much* and *At What Cost* elements of the Performance Budget are sought to be identified with the given budget material, in the workshops.

The participants are divided into groups. Each group will have a convener from among the participants and an Adviser from among the Faculty of the Course. The choice of the Convener is governed by considerations of ready availability of budget and related file materials.

The Papers

The papers with all file materials relevant for the exercise, include the following :

Workshop Exercise : What it is

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For an operating department :

- (a) The latest Annual Report of the organisation
- (b) Relevant plan documents
- (c) Budget papers showing details of break-up, Part I, II & III Demands for Grants and explanatory notes and notes on plan schemes and so on.

For capital project :

- (a) Copy of the Feasibility Report
- (b) Copy of the Expenditure Finance Memo or its equivalent if any
- (c) Copy of Detailed Project Report
- (d) Copy of detailed sanction of the project
- (e) Copy of project estimates, with work-break-down structures, schedules of completion of stages etc., if any
- (f) Copy of the progress reports showing financial as well as physical attainments, in case the project is already on.

The Exercise

The exercises will be guided by a member of the Faculty of the Institute, who will be designated as the Adviser of the Group.

The participant who assists by way of papers, budget materials etc., is usually the Convener of the Group and it is he who explains to the group the functions and scope of the organisation or department or the project. It is largely at his initiative that the exercise is conducted, the other participants assisting him by way of (i) preparing the network or work break-down schedule (for a project), (ii) breaking the functions into cohesive programmes or activities, (iii) breaking the budget figures correspondingly to relate finance to physically attainable targets (within the given time-schedule, in the case of a project) and (vi) drafting the workshop report.

In an ideal situation, the relating of the funds to physical targets referred to in item (iii) above, will be governed by suitably evolved and up-dated yard-sticks of work and work-measurement and costing techniques-all these elements woven into meaningful and operable patterns for purposes of management control by means of reporting systems devised to suit the particular level of management.

The limited purposes of the exercise may now be summarised as consisting of following elements :

- (a) Understanding the specific function of the organisation/ department/project.
- (b) Classifying the functions into identifiable programme-heads.
- (c) Sub-dividing the programmes into sub-programmes or activities and grouping them under the programme-heads.
- (d) splitting up the budget figures to correspond to the pattern at (b) and (c)
- (e) Grouping the financial outlays where they exist under different budget heads so that the sources of finance are displayed at one place.
- (f) Explaining the financial outlays in terms of physical targets.
- (g) Writing out the report which will now display the following parts :

Introduction	briefly stating what the report is about
Classification	identifying programmes and activities
Financial outlays and explanation	indicating available finance to achieve the physical targets
Financial report	grouping various budget heads where finances exist for various activities covered in the report.

Discussion of the Workshop Reports

The stencilled Reports (together with the various annexures etc.) are circulated among the participants at least a day in advance of the scheduled date of discussion. The reports are discussed and debated among the participants, the classifications and other parts of the reports being challenged or elucidations sought and the same being defended. Generally the Convener of the group initiates the discussion pertaining to his report, any other member of his group assisting him in the discussion and debates. It is in the discussion that many new ideas are thrown up and further understanding achieved.

3

WORKSHOP EXERCISES

I KORATTUR NEIGHBOURHOOD SCHEME

Introduction

THE Korattur Neighbourhood Scheme is one of the important schemes undertaken by the Tamil Nadu Housing Board for easing the housing shortage in the city of Madras. The scheme proper is located near Ambattur Industrial Estate about 13 kms. from the city of Madras (about 3 kms. outside the city limits) along the Madras-Thiruvallur Road. It is connected with Madras city by frequent bus and train services.

In view of its proximity to the city and in view of its central location with reference to the major industrial activities in Ambattur, the development of this scheme will go a long way in solving the acute shortage of housing problems in the city.

Details of the Scheme

Under this scheme, 59.28 hectares of land have been acquired and developed by giving essential amenities like roads, parks, water supply, drainage, street lights, schools, shopping centres, community hall etc. It is proposed to develop 1,160 residential plots for the different strata of society like Low Income Group, Middle Income Group and Economically Weaker Sections. Of these, 642 plots are proposed to be sold either on outright sale basis or on hire purchase basis and the remaining 518 plots are reserved for construction of quarters for Low Income Group, Middle Income Group and Economically Weaker Sections of the community as detailed.

1. Economically Weaker Sections	136 Units
2. Low Income Group	365 „
3. Middle Income Group	300 „
Total	801

In addition, it is proposed to construct 60 shops and one Community Centre to cater to the needs of the residents in that scheme. The intention is that the scheme should be an ideal and self-contained one in the vicinity of Madras.

Financial Outlay

The total cost of the project is of the order of Rs. 225.60 lakhs as per details below :

	(Rs. in lakhs)
Development of land	76.46
Construction of residential buildings	141.14
Construction of shops and community centre	8.00
Total	225.60

The year-wise break-up details both physical and financial, have been indicated in the performance budget (Annexure IV).

Programme of Execution

The development works were taken up in August 1970 and they are expected to be completed in all respects by the end of '73-'74. The construction works have commenced in '71-'72 and they are also expected to be completed in all respects in about 3 years.

Financial Position

This project is proposed to be executed through loans obtained from the Housing & Urban Development Corporation Limited, New Delhi under the 'Revolving Fund' Scheme. The Housing & Urban Development Corporation will be releasing financial assistance at the beginning of every financial year depending upon the programme of execution for that particular year. The receipts realised by way of outright sale of houses, plots, flats as well as hire purchase instalments thereof will be utilised for the repayment of the amounts of loan together with the interest, at the end of each year in annual instalments depending upon the amount of receipts realised in that year.

Time Schedule

The whole scheme is proposed to be executed over a period of 4 years which would include land acquisition and development, construction of quarters under different categories and provision of ancillary facilities.

Objective of Workshop Study

Instead of preparing an ad hoc schedule and budget based on such a schedule, it is proposed to apply the Network Technique (PERT/CPM) for evolving realistic schedules and cost estimates in a more rational way, and prepare a performance budget for the entire scheme.

The workshop study, therefore, involves the preparation of the following :

- (1) Development of a Work Breakdown Structure for the entire project;
- (2) Development of a Master Control Network for the entire project, based on the Work Breakdown Structure;
- (3) Preparation of a Bar-Chart showing the time-cost schedule based on the Master Control Network;
- (4) Preparation of a Performance Budget for the scheme based on the Bar Chart;
- (5) Evolving a Performance Control Schedule.

The above items are discussed below :

Development of Work Breakdown Structure

The entire project has been conveniently divided into three major constituents, i.e. land acquisition, land development and construction. These major constituents have, in turn, been sub-divided into their functional components. Care has been taken to include all the items of works forming part of the project so that this Work Breakdown Structure will form the basic document for constructing net-works and for evolving a rational schedule. Such a Work Breakdown Structure developed for the project is at Annexure I.

Development of Master Control Network for the Entire Project

Based on the Work Breakdown Structure, a Master Control Network has been prepared which included all the major components etc. as shown in the Work Breakdown Structure. The objectives of developing the Master Network for the entire project are: (i) that it

includes all the works forming part of this project, without any omission; (ii) it shows at a glance all the functional areas of this scheme at one place; (iii) it determines the project duration and highlights the potential problems of the project and provides a basic document for all further planning and control of the project. A Master Control Network so developed for the Scheme is at Annexure II.

Bar Chart (Time-Cost Schedule)

All the work-packages included in the Master Control Network against each major item are taken and are drawn to time scale, in the form of a Bar Chart. The Bar-chart so drawn shows the commencement and the completion dates in respect of each work package. These dates are derived from the Earliest and the Latest Event Times as indicated in the Master Control Network. Thus, the time-schedule prepared this way is based on a rational method and not on ad hoc assumptions.

The Bar-Chart is then divided into the financial years to identify the quantum of work involved against each item in respect of each financial year. Thereafter for executing the works under each year, costs are added. The summation of the costs vertically, in respect of each year is made, to obtain the estimated costs for each financial year and also the total project. Obviously, these cost figures constitute the year-wise budget for the whole scheme, commencing from August, 1970 and spreading over for a period of about four years. The Bar-Chart is shown in Annexure III.

Performance Budget

Based on the data contained in the Bar Chart, a Performance Budget for the whole scheme is prepared. This performance budget indicates the budget for the current year as well as the budget figures for the future years, upto the completion date of the project. In addition to the budget figures in respect of each year, the percentages of progress to be achieved against each year, in physical terms, have also been worked out, giving certain weightages for the works to be executed. The Performance Budget proforma also includes the percentage of physical progress to be achieved in each year. A correlation is therefore, obtained between the financial requirement for each year and the corresponding physical progress. This Performance Budget, therefore, becomes a time-cost schedule for the entire

project. The Performance Budget so prepared for the scheme is at Annexure IV.

Performance Control Schedule

A proforma has been evolved for Performance Control and is shown at Annexure V. This shows the original total estimated cost for each component as derived from the Bar-Chart and the corresponding physical achievement for the current year. In order to compare these planned costs and physical progress with the corresponding achievement, the actual expenditure during the current financial year and actual physical progress achieved during the year are expected to be shown in this statement, through a reporting system, based on the Network Technique. By comparing the estimated costs and performances with the actuals, the corresponding variances can be found out for the current year and recorded in the relevant columns of the proforma.

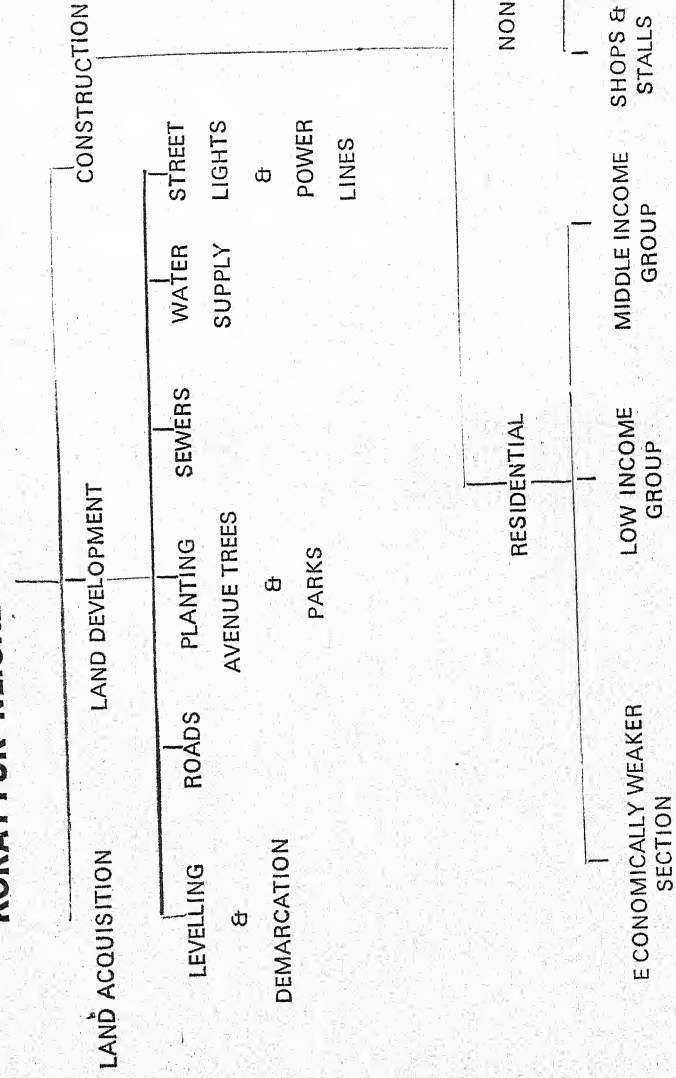
As the Network facilitates assessment of the time-schedule for the works to be performed during the next financial year and the corresponding physical progress, these can be assessed and included in the statement. Another significant advantage of applying the Network Technique to evolve Performance Budget is that it is possible to project in the Network to obtain the revised total cost and the revised total project schedule and their variances. These can be assessed on every progress review date and recorded in the relevant columns wherever cost over-runs and schedule slippages occur. By taking timely corrective action, it is possible to have effective control over time and cost to achieve the time and cost objectives of the project.

Conclusion

Notwithstanding the advantages that could be derived by using the Network technique for planning and scheduling of the works of this project, benefit will be derived only by taking timely corrective action on every progress review date, based on the actual progress made. It needs updating of the networks, periodically, on every review date, based on the actual progress made, identifying the critical part periodically and preparing revised schedules and cost estimates which exercise has to be carried out throughout the entire construction

period. Therefore, in addition to evolving a performance budget, vigorous follow-up action is an essential factor that should be carried out to achieve the desired results.

(ANNEXURE I)
WORK BREAKDOWN STRUCTURE
KORATTUR NEIGHBOURHOOD SCHEME (PHASE I)



(ALL COST RS. IN LAKHS)

KORATTUR NEIGHBOURHOOD PHASE I

PROJECT PERFORMANCE CONTROL SCHEDULE

[illegible]

II. DIRECTORATE OF ADVERTISING & VISUAL PUBLICITY

PERFORMANCE BUDGET: 1971-72.

Introduction

The D.A.V.P. is an attached office of the Ministry of Information and Broadcasting. It functions as a central organisation for publishing the programmes and policies of all the Central Government Ministries and Departments (excluding Railways), through the media of press advertisements, printed publicity, outdoor publicity, radio spots and exhibitions. It also services autonomous bodies and public sector undertakings.

The organisation offers a complete range of advertising and publicity services from advising the clients on publicity to selecting of campaign themes, media planning, visualization and implementation of campaigns. It is the biggest single advertiser in the country, using the largest number of newspapers and periodicals-as many as 1700, for its press advertising.

The main campaigns of publicity and other allied works are given below :

1. National Savings.
2. National Integration.
3. Family Planning.
4. Nirodh.
5. Plan Publicity—greater participation of the people in the Plan development effort.
6. Post and Telegraph Campaigns.
7. Food and Agriculture.
8. Public Sector Image Building.
9. Accreditation of advertising agencies and connected policy matters.
10. Publicity for situations vacant, tender notices etc. for getting competent persons/selling and purchasing to the maximum advantage of the Government.
11. Production of Wall Newspaper.
12. Other miscellaneous campaigns—Defence, Directorate General of Supplies and Disposal, Ministry of Home Affairs etc.

D.A.V.P. is headed by a Director with the status and powers of a Head of the Department. At the guidance and coordination level, he is assisted by a Senior Deputy Director, five Deputy Directors, Chief Visualiser, Chief Copy Writer, Chief Exhibition Officer, Chief Accounts Officer and Financial Adviser.

The executive units in D.A.V.P. consist of :

1. Campaign Wings : concerned with planning and programming and a liaison between DAVP on the one hand and client Departments and Ministries on the other.
2. Studio.
3. Language Section.
4. Copy Writing.
5. Production Wing. (concerned with the production of posters, folders etc.).
6. Outdoor Publicity Wing (deals with production of cinema slides, boards, hoardings, metal printing, etc).
7. Distribution Branch.
8. Advertising Branch.
9. Exhibition Division.
10. Research Unit.
11. Administration, Budget and Accounts.

The organisation has 3 regional distribution centres at Bombay, Calcutta & Madras, 31 Field Exhibition Units and a workshop for preparation of prototype & exhibits.

The financial requirements of the Directorate are given in Section II.

II. Financial Requirements :

	Actual Expenditure (Deptt. Figures) 1970-71	Budget Estimates 1971-72
A. Programme/Activity Classification		
1. Exhibitions	15,17,700	22,01,000
2. Radio Spots	9,25,000	14,55,000
3. Press Advertisements,	1,69,92,600	1,60,45,000
4. Printed Publicity		
(a) Production.	65,63,200	76,62,300
(b) Distribution	16,00,000	14,00,000
5. Outdoor Publicity.	37,66,600	45,89,700
6. Research.	30,000	33,000
7. Direction & Organisation	47,43,400	53,71,000
Total : A	3,61,38,500	3,87,57,000
B. Objects of Expenditure		
1. Establishment Charges.	38,13,200	45,58,000
2. Travelling Allowances.	3,03,500	3,05,000
3. Other Charges.	22,56,700	19,41,000
4. Exhibition Expenses	15,17,700	22,01,000
5. Expenses on Display & Classified Advertisements.	179,17,600	1,75,00,000
6. Other Publicity Expenses (Printed & Outdoor)	1,03,29,800	1,22,52,000
Total : B	3,61,38,500	3,87,57,000
C. Sources of Funds.		
1. Demand No.63 Major Head 39—B (Revenue Budget)	2,50,13,500	2,71,71,000
2. Demand No. 38 Major Head 30—A (Revenue Budget)	91,25,000	95,86,000
3. Advance Deposits (Deposit Work)	20,00,000	20,00,000
Total : C	3,61,33,500	3,87,57,000

Notes : 1. In this section, the break-up of figures under A, B and C should be indicated for Plan, non-plan and total in each year's column. This has not been done for want of ready information.

2. The object-wise break-up in sub-section B could be elaborated further into meaningful items of expenditure. This has not been done for want of the required break-up.

- The amount is expected to increase during the current year after the establishment of 3 fully equipped branch offices at Calcutta, Bombay and Madras. It is not possible to estimate accurately at this stage the expected increase on this amount.

III. EXPLANATION OF FINANCIAL REQUIREMENTS 1971-72.

1. Exhibitions

To publicise the Five Year Plans through the medium of exhibitions, an Exhibition Division was set up under the Planning Commission in 1953. Later it was transferred to the Ministry of Information & Broadcasting. In 1955, the Exhibition Division was made a part of D.A.V.P. Since then, the Division has considerably expanded its scope of activities, and today it is doing pioneering work in not only publicising the Plans, but also projecting through this vital visual medium, all the various facets of Government policies, programmes and performance.

The break-up of the budget provision under this head is as follows :-

	Actual for 1970-71 in Rs.	Budget Estimates 1971-72, in Rs.
(a) Family Planning & Nirodh Campaign		6,00,000 (Plan)
(b) Other campaign	15,17,000	14,01,000
Supply of exhibits (non-plan) for Nirodh campaign and Asian Trade Fair		2,00,000
	15,17,000	22,01,000

The select work-load under this activity is shown in the following table :

Table I

Particulars	Programme	1969-70	1970-71		1971-72
		Actual	Programme	Actual	Anticipated
1. No. of exhibitions held (i) Family Planning & Nirodh campaign; (ii) Other campaign;				600	700
2. No. of exhibits prepared. (i) Family Planning & Nirodh campaign. (ii) Other campaign					
3. No. of persons who are estimated to have seen the exhibitions					

The staff deployed for this activity is as under :

Table II

Particulars	1969-70	1970-71	1971-72
Chief Exhibition Officer			1
Exhibition Officers			2
Exhibition Inspectors			4
Exhibition Assistants			28
Others			--

2. Radio Spots

This is a new medium of advertising introduced a couple of years ago in the Vividh Bharti programme of All India Radio.

The break-up of expenditure and provision is as follows :-

	Actuals 70-71 Rs.	Budget Estimates 71-72 in Rs.
(a) Family Planning & Nirodh campaign		6,50,000
(b) Other campaigns	9,25,000	(Plan) 8,05,000 Non-Plan
	9,25,000	14,55,00

The select work lead under this activity is as follows :

Table III

Particulars	1969-70		1970-71		1971-72	
	Programme	Actual	Programme	Actual	Programme	Actual
i. No. of Radio spot campaigns.			6		8	
ii. No. of Radio stations covered						
iii. No. of broadcasting hours involved						

The staff deployed for this activity is as follows :

Table IV

Particulars	1969-70	1970-71	1971-72
No. of G.O.s			
No. of staff			

3. Press Advertisements

Press Advertisements are issued to give publicity of campaigns on National Savings, Nirodh, Family Planning etc. Tender Notices, situation vacancies, scholarship schemes are also advertised through Press. In 1971, casual campaign on census has also been carried out through such advertisements. Campaigns on behalf of Public Sector Undertakings are also taken up for image building.

The break-up of actuals for 1970-71 and of the provision for 1971-72 is, as shown below :

	Actuals 1970-71 Rs.	Budget 1971-72 Rs.
(i) Family Planning Nirodh Campaign		32,00,000
(ii) Other Campaigns	1,69,92,600	1,08,45,000
(iii) Campaigns on behalf on Public Sector Undertakings	1,69,92,600	20,00,000
		1,60,45,000

The following table shows the select work-load under the activity:

Table V

Particulars	1969-70		1970-71		1971-72
	Progra mme	Achie vement	Progra mme	Achie vement	Progra mme
(i) No. of Display Advertisements					
(a) Family Planning/Nirodh Campaign					
(b) Other Campaigns					
(c) For Public Sector Undertakings					
(ii) Number of Classified Advertisements					
(a) Family Planning/Nirodh Campaign					
(b) Other Campaigns.					
(c) For Public Sector Undertakings				9,885	9,850
(iii) Number of newspaper, periodicals covered.				1,700	1,700
(iv) No. of Inspections/space in Col. Cms.					
(v) No. of Regional languages covered					

The following table shows the staff deployment position for the purpose of Press Advertisement.

Table VI

S. No.	Designation	1969-70	1970-71	1971-72
1.	Deputy Director	1	1	1
2.				
3.	etc., etc.			

4. Printed Publicity

(a) Production

Under this activity jobs for printing folders booklets, brochures, posters, broadsheets etc, are undertaken, Diaries, calendars and

match box labels are also printed to highlight various campaigns on Nirodh, Family Planning and other development activities of Government so as to project the developing India in its proper perspective, mostly to readers abroad. The production of wall newspapers in different languages is also undertaken.

The break-up of actuals and budget provisions is as follows :

	Actuals 70-71 Rs.	Budget 71-72 Rs.
a) Family Planning/Nirodh Campaign		19,00,000
b) Other Campaigns	65,63,200	57,62,300
	65,63,200	76,62,300

b) Distribution;

There is a separate distribution wing where addresses drawn from various institutional, professional & individual groups in rural as well as urban areas are maintained. The distribution is done in such a way that the printed materials reach the targets. Copies of pictorial booklet "India To-day" with other illustrated brochures viz, "Glimpses of India and Heritage of India" in the form of an attractive kit are distributed abroad, through our diplomatic missions. This branch is being mechanised by introducing an IBM machinery so as to expedite distribution of printed materials to over 5 lakhs addresses. on direct mailing system. The break-up of actuals and budget provision is as below :

	Actuals 1970-71 Rs.	Budget 1971-72 Rs.
1. Family Planning/Nirodh campaign.		
2. Other campaigns	16,00,000	14,00,000

The following table will show the select work-load under this programme :

Table VII (a) - PRODUCTION

Particulars	1969-70		1970-71		1971-72
	Programme	Achievement	Programme	Achievement	Programme
1 No. of jobs undertaken.				249	257
2 No. of folders, brochures, booklets printed.					
3 No. of posters, broadsheets printed.					
4 Diaries, calendars, match-box labels printed.					60,000
5 No. of copies of wall newspapers printed.					8
6 No. of languages covered.					

Table VII (b) Distribution

Particulars	1969-70		1970-71		1971-72
	Programme	Achievement	Programme	Achievement	Programme
1. No. of jobs distributed.				200	200
2. No. of folders, brochures, booklets distributed.					
3. No. of posters, broadsheets distributed.					
4. Diaries, calendars, match box labels distributed.					
5. No. of copies of wall newspapers distributed.					
6. No. of Languages covered.					
7. No. of addresses covered					
(i) Government offices/ Departments,					
(ii) non-Government categories.					

The staff position for production and distribution of publicity materials is as indicated below :

Table VIII

	1969-70	1970-71	1971-72
1. Deputy Director			1
2. Production Manager			4
3. Distribution Manager			1
4. Assistant Production Manager			18
5. Assistant Distribution Manager			7
6. I.B.M. Data Processing Officer etc. etc.			1
Total			32

5. Outdoor Publicity

This wing handles publicity through cinema slides, hoardings, metallic tablets etc for publicising the various policies and programmes mentioned in the introduction.

The break-up of the budget provision under this head is as follows :

	Actual 1970-71 Rs.	Budget estimates 71-72 Rs.
(i) Family Planning and Nirodh Campaigns	37,66,600	20,00,000
(ii) Other Campaigns		25,89,700
	37,66,600	45,89,700

The select work-load under this activity is as follows :

Table IX

Particulars	1969-70		1970-71		1971-72
	Programme	Actual	Programme	Actual	Programme
i) No. of Cinema slides				149	180
ii) No. of hoardings					
iii) No. of Metallic tablets.					

The staff deployed under this activity is as under :

Table X

Particulars	1969-70	1970-71	1971-72
No. of G.Os.			
No. of staff			

6. Research

The Research Unit of D.A.V.P., though small in size at present, undertakes selective pre-testing and post-release evaluation providing useful feed-back for improving the form and content of the publicity organised by D-A.V.P.

The budget provision under this head is as follows :

	Actuals 1970-71 Rs.	Budget Estimates 71-72 Rs.
Research	30,000	33,000

The select work-load under this activity is given as under :

Table XI

Particulars	1969-70		1970-71		1971-72
	Progra- mme	Actual	Progra- mme	Actual	Programme
No. of surveys conducted				5	5

The staff employed for this activity is as follows :-

Table XII

Particulars	1969-70	1970-71	1971-72
Research Officer			1
Assistant Research Officer			1
Research Assistants			4
Other staff			
Total			

7. Direction and Organisation

In Lakhs of Rs.

Actuals 1970-71	Budget 1971-72
47.43	53.71

Direction and Administration charges represent pay and allowances and other expenditure on the Directorate proper as also the three Regional Distribution Centres and 31 field units, and a workshop for preparation of prototype exhibits.

The Directorate is the central advertising agency for all the Departments and Ministries (except Railways) of the Government of India. It also services autonomous bodies.

The expenditure includes the provision for Planning and Programming.

The following table shows the strength of the Directorate and its Regional Offices :

Table XIII

	1969-70	1970-71	1971-72
Director		1	1
Senior Dy. Director		1	1
Dy. Directors		5	5
Chief Visualiser		1	1
Chief Copy Writer		1	1
Chief Exhibition Officer		1	1
Chief Accounts Officer & Financial Adviser		1	1
Other Officers			
Ministerial Staff		118	135
Class IV Staff		494	533
		225	244
Total		848	923

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GLOSSARY OF TERMS

Programme Budget *Output Budget* **PPBS:**

EXPENDITURE is classified, where parliamentary voting system of government prevails, according to inputs; that is to say, General Administration, New Buildings, Staff etc. This simplifies the tasks of accounting and audit and occasionally control. It does *not* relate expenditure to the objectives for which it is being incurred.

Programme budget seeks to correct this. Ideally one programme ought to correspond to one major policy objective. It is not possible in government to do so as its activities contribute to more than a single objective. Much public expenditure however, will be able to relate to an intermediate output rather than achievement of the ultimate objective. For example we may relate the expenditure on school education to the number of schools opened or placements therein but not to the effect of education on children in the areas.

Programme budgets should include some measures of what has been achieved with past expenditure and what is intended to achieve with future expenditure. It is therefore useful to look upon it as having structural, analytical and informational aspects. The system seeks to build on existing developments by following an

Glossary of Terms

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explicit procedure for reviewing long-range plans periodically in the light of new information, evaluation and analysis and translating the same into budgetary consequences.

Programme Budget is analogous to the US Planning Programming Budgeting System (PPBS). In the U.K. the term is synonymous with Output Budgeting. Programme Budgets are developed on a multi-year basis.

Performance Budgeting

It is a budgetary system showing the end-products and their relationship with costs. Performance Budgeting is management or efficiency-oriented and is not concerned with planning but has to do with the given tasks. Programme Budgeting is planning or effectiveness-oriented. Performance Budgets are generally framed on an annual basis.

Systems Analysis

Complex problems of choice arise in conditions of uncertainty—for example, national security, educational planning etc. "Systems Analysis is associated with that class of problems where the difficulty lies in deciding what ought to be done—not simply how to do it and honours go to people who find out what the problem is" (E.S. Quade, 1964).

Systems Analysis does not take the objective as absolute nor will it produce a unique 'optimum' solution. It is intended to analyse and display the issues to the policy-maker in a way which while reducing the areas of uncertainty enables him to exercise his subjective and political judgements to better effect.

In the widest sense, PPBS itself is the application of Systems Analysis to decision-making.

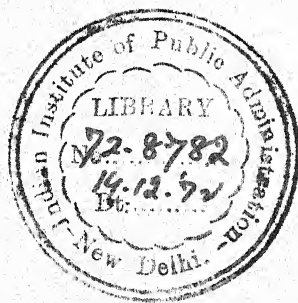
Cost-Benefit Analysis

It attempts to identify the alternative that yields the greatest effectiveness for the given cost. In other words, it projects the required or chosen degree of effectiveness for the least cost.

Information/Feed-Back Systems

Effective management control is facilitated by the feedback principle : that is the mechanism by which information on the effects of a decision is supplied back to the decision-maker for evaluating and comparing the data with what was intended. This helps to locate areas for further decisions to be taken. Feedback is thus information to support decision-making but it is critical to effective development and operation. In the context of programme/performance budgeting, information systems include (a) cash accounting systems (appropriation audit) (b) cost accounting systems (effectiveness audit) (c) recording systems for communicating at and to all levels of operation and (d) retrieval/storage systems for maintenance of historical data.

Modern information systems are computer based.



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